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**TOWARDS AN INTERACTIVE  
MOBILE LECTURING MODEL:  
A HIGHER-LEVEL ENGAGEMENT FOR ENHANCING  
LEARNING**

**Olutayo Kehinde Boyinbode**

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DOCTOR OF PHILOSOPHY  
To the Department of Computer Science**

**UNIVERSITY OF CAPE TOWN**

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Supervised by  
Prof. Dick Ng'ambi  
Dr Antoine Bagula

## DECLARATION

I declare that this thesis is my own original work. Where collaborations with other researchers are involved, or materials generated by other researchers are included, the parties and/or materials are acknowledged or are explicitly referenced as appropriate.

This work is being submitted for the degree of Doctor of Philosophy in Computer Science of the University of Cape Town, South Africa. It has not been submitted to any other university or institution for any other degree or examination.

Signed by candidate

Olutayo Kehinde Boyinbode

3<sup>rd</sup> May, 2013

Date

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## ABSTRACT

The use of mobile devices has grown in recent years and has overtaken the proliferation of desktop computers with their dual affordances of small size and easy connectivity in diverse fields. The usage of these devices has not been widespread in higher education. Mobile technology is a new and promising area of research in higher education. The affordance of mobile technologies has prompted their adoption as a means of enhancing face-to-face (f2f) learning. In this thesis, mobile lecturing is presented as a means of achieving mobile learning. The availability of mobile devices has positively enabled the mobile lecturing process. F2f lectures are recorded and distributed as lecture vodcasts using mobile devices. The vodcasts are generated through Opencast Matterhorn and YouTube. Currently, there are few descriptive models of mobile lecturing that can be used to enhance learning in Higher Education Institutions (HEIs). This thesis has several contributions: first I propose a “MOBLEC” theoretical model of mobile lecturing; mobile lecturing represents a new paradigm in mobile learning which enhances students’ engagement with lecture vodcasts to foster deep learning. The second contribution of this thesis is a mobile lecturing tool, MOBILect. MOBILect is developed in HTML5 for cross-platform solution across most mobile devices. This tool enables students to use mobile devices to actively interact with lecture vodcasts and with peers using the vodcast. Finally, I use different case studies to evaluate the MOBLEC model to explore the effectiveness of mobile lecturing in enhancing learning in HEIs. The MOBLEC model is proposed to define mobile lecturing: it describes mobile lecturing as a process resulting from the convergence of mobile technologies, learning engagements and learning interactions. The case studies are evaluative, relying on a group of students to evaluate the MOBLEC by accessing MOBILect. Empirical data was acquired through triangulation method involving focus group discussions, open-ended questions and

interviews. All the questions were based on the MOBLEC model. The result of the studies provided positive indicators as to the usefulness and effectiveness of mobile lecturing in engaging students to enhance and foster deep learning. Mobile lecturing, through augmenting and accessing lecture vodcasts on students' mobile devices anywhere and at any time, with an affordance to comment and respond to comments, has potential for empowering students who might be struggling to understand f2f sessions and the aggregated comments become a valuable educational resource. The thesis also outlines areas for future research work.

University of Cape Town

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## GLOSSARY

**Collaborative learning:** A method of teaching and learning in which students' team together to achieve a shared objective such as exploring a solution to a significant question or creating a meaningful project. Cooperative learning is a specific kind of collaborative learning as it allows students to team together to help each other achieve an individual goal.

**Constructivism:** This places the student at the centre of a learning activity and learning is a process of constructing students' own meaning.

**CSS:** Cascading Style Sheets (CSS) is a language that describes how HTML mark-up is presented or styled. CSS3 is the latest version of the CSS specification.

**Deep learning:** A form of learning where students construct meaning and understanding from learning resources and experiences through high-level interactions.

**Engagement:** Student engagement refers to a student's willingness, need, desire and compulsion to participate in, and be successful in, the learning process hence promoting high-level thinking for enduring understanding.

**Firewall:** A system configured to permit or deny computer traffic between different security domains based on a set of rules and other criteria.

**Higher Education Institutions (HEIs):** Post-secondary, tertiary or third level education is the stage of learning that occurs at universities, academies, colleges, seminaries, and institutes of technology. Higher education also includes certain collegiate-level institutions, such as vocational schools, trade schools, and career colleges that award academic degrees or professional certifications.



**HTML** (Hypertext Mark-ups Language): A programming language used to create documents for display in web browsers.

**HTML5:** The latest iteration of the mark-up language, and includes new features, improvements to existing features, and scripting-based APIs. It is designed to work on just about every platform and has been adopted by most mobile phone browsers. It provides for offline storage and does not require plug-ins.

**Informal learning:** Informal Learning is not organised or structured by an institution like formal learning. It may take place anywhere, for example museums, hotels, gyms or anywhere the student chooses, including at work.

**JavaScript:** JavaScript® (sometimes shortened to JS) is a lightweight, object-oriented language, most known as the scripting language for web pages.

**Mobile device** (portable device): A device that can be used to access information and learning materials from anywhere and at any time at the convenience of the learner. It is also a tool for interaction and engagement with the social networks.

**Mobile learning:** This is defined as a type of learning that allows students to engage in learning with mobile technologies when on the move.

**Mobile lecturing:** Mobile learning focuses on supporting learners while on the move with mobile devices while mobile lecturing allows students to engage with lecture vodcasts on their devices with learning tasks set up by educators or instructional designers to enable mobile learning to happen.

**MP3:** A digital audio encoding format. It is more accurately called MPEG-1.

**MPEG-4:** This is also a compression format for audio and video.

**Opencast Matterhorn:** Open-source software designed to support the creation and management of educational audio and video content.

**Operating System (OS):** The base software of a computer device; mobile OSs include Blackberry, iOS, Pocket PC, Android and Symbian etc.

**PHP** (recursive acronym for PHP: Hypertext Pre-processor): This is an open-source, general-purpose scripting language that is used for web development and can be embedded into HTML.

**Podcast:** It can be audio-based or video-based (Vodcast) and is delivered via the internet in a format that is compatible with computers and most mobile devices, generally MP3 or MPEG-4; a podcast can be regularly updated and automatically downloaded through software such as iTunes and RSS feeds.

**Podcasting:** is the practice of generating and using podcast or vodcast files, designed to be syndicated through feeds via the internet and played back on mobile devices. New content is delivered automatically when it is available.

**RSS feed (Really Simple Syndication):** This is a means of sharing and broadcasting content from a website. Items are automatically downloaded into a special 'Reader' or published onto another website or device.

**Smartphones:** A mobile phone with some advanced features, such as a web browser.

**SMS (Short Message Service):** SMS is a service for sending short text messages to mobile phones.

**SMS Lingoes:** A list of chat acronyms and text message short hands.

**Wi-Fi (Wireless Fidelity):** A set of standards for facilitating wireless networks in a local area, enabling Wi-Fi devices to connect to the Internet when in range of an access point.

**YouTube:** A video-sharing website, where users upload, and view and share videos.

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# **Chapter One: Introduction**

## **1.1 Introduction**

Mobile learning (m-learning) has been around for years, but not until the last decade have the technological advances, proliferation of mobile devices and diverse applications popularized m-learning (Caverly, C., Ward, R. & Caverly, J, 2009). With the evolution of powerful mobile phones, smartphones, and Wi-Fi devices with sophisticated operating systems (for example iOS, Android), users have access to desired information at their convenience anywhere and at any time. With the existing mobile technologies, users can create tools at their disposal to initiate exciting m-learning experiences. Although most of these mobile devices and technologies are not tailored to creating learning experiences, the devices have existing platforms on which learning interactions can be initiated (Clough, Jones, MacAndrew & Scanlon, 2008). Hence, mobile technologies have created affordances for students to engage in learning activities at any time and in any location (Sharples, Sanchez, Milrad & Vavoula, 2008). M-learning concepts can be looked at in the following perspectives: emphasis on mobile technology being used (Wang, Y., Wu, M. & Wang, H, 2009), emphasis on the learning location (Wagner, 2005), emphasis on both the mobile technology and the learning location (Motiwalla, 2005; Traxler, 2007). Learning is dependent on the mobility of the technology and the learner (El-Hussein & Cronje, 2010). Though students learn on the move with their mobile devices, without the guidance or instructions from the educator, while this is useful, such learning has remained unevaluated and unappreciated. Though a number of studies have been carried out focusing at the major benefits that mobile learning offers educators, the role of the educator in the m-learning experiences has remained minimal and in some cases absent (Markett, Sa'nchez, Weber, & Tangney, 2006; Kim, Mims, & Holmes, 2006; Kukulska-Hulme & Traxler, 2005; Peters,

2007). In mobile lecturing, students can learn on the move with their devices with less educator involvement. Educators design tasks for m-learning so that students' learning can be evaluated (Kim et al., 2006).

One of the challenges facing traditional face-to-face (f2f) lectures in higher education institutions (HEIs) in particular, developing countries of Africa is low-level engagement of students (Evans, 2008); students cannot engage in discussion because of the limited time for discussion, which is very important in the f2f lecture or the lecture is too difficult for students to follow, so they cannot interact. Students cannot ask questions because of the time constraint; sometimes it may become cumbersome to understand the f2f lecture because it is teacher-centred and students are not in control of their learning (Hoven, 1999). This challenge is more pronounced when students are not learning in their mother tongue, or classes are just too large, or the students are academically under prepared for higher education which is the case for some students of HEIs in developing countries of Africa.

In f2f lectures, understanding what is being taught might be an overwhelming task due to aforementioned challenges (Dzubak, 2009; Haddad, 2006; Jaffer, Ng'ambi & Czerniewicz, 2007; Nzimande, 2009). Most f2f lectures, especially those involving large classes, tend to be unidirectional; hence there is low-level engagement of the students with the f2f lecturers so that when students fail to understand the lectures during the once-off f2f sessions, there is no opportunity to "re-live" the lectures. Though students may take notes during the f2f lecture, there is no time for interactions among the students to share ideas and knowledge gained during the lectures.

Many initiatives have come up in the form of recording f2f lectures, such as Opencast Matterhorn (Opencast, 2012), Virtual presenter (Ketterl, Mertens, Morisse & Vornberger, 2006), OpenEyA (OpenEyA, 2012), The E-Chalk project (Friedland, Knipping, Tapia &

Rojas, R. 2004) and Tele-task (Wolf, Linckels & Meinel, 2007). These initiatives seek to help students to play back recorded lectures but still tend to be unidirectional. Most students engage with lecture recordings in a unidirectional manner (one-way communication), i.e. speaker-to-listener, hence there is no interaction with peers or teachers, which can hinder a deep learning experience (Copley, 2007; Lee & Chan, 2007; McGarr, 2009; Oliver & Luca, 2007). Mobile devices have evolved as a ubiquitous tool in higher education which can serve as a platform for delivering learning experiences to students (Clough et al., 2008); students can be seen carrying their mobile devices alongside their academic books everywhere on campus. It is very difficult to see a student without his or her mobile device.

According to (ITU, 2010) there are an estimated 5.3 billion mobile cellular subscriptions worldwide. Internet statistics in South Africa, 2012 indicates that there are a total of 7, 9 million South Africans that access the Internet on their cell phones (Ross, 2012). Mobile devices have indeed become very popular; a recent survey of mobile device usage among University of Cape Town (UCT) students indicates that 85 per cent of the students' population possess smartphones (UCT Student Survey, 2011). There has been an increase in the use of mobile devices by students because of their relatively low price, compactness and easy usability (Crawford, 2007). Aside from the increased use of smartphones and cell phones, the use of other mobile devices also continues to increase (Lenhart, Purcell, Smith & Zickuhr, 2011). Mobile devices are portable and can be carried everywhere, so enhancing learning anywhere and at any time (Heiphetz, 2011). Through networking facilities, a mobile device can ensure connection between groups of students to ensure a bidirectional interaction. Hence an interactive mobile learning system is proposed where students can interact with recorded lectures on their mobile devices. An interactive system through the affordances of mobile devices could maintain a much higher-level of student involvement and engagement



in learning. In general, mobile devices can be considered as important devices that could be used to enhance students' interactions in a learning environment.

## **1.2 Background to Research**

Lecture recordings and dissemination have potential to impact teaching and learning resources in higher education institutions (HEIs) in South Africa, where some HEIs are already exploring lecture recording in the form of podcasting and vodcasting (Ng'ambi, 2008b; Ng'ambi, 2010). This exploration has emerged as a way of widening access to learning resources and improving learning among their students (Boyinbode, Bagula & Ng'ambi, 2012; Evans, 2008; Lee & Chan, 2007). Podcasts are media files in audio- and video-digital formats distributed over the internet using Really Simple Syndication (RSS) technology or Atom feeds (RSS, 2002). Video podcasts are called vodcasts. Podcasts are unidirectional (one-way communication) and have low-level engagement for students. Students interact with podcasts or vodcasts to create learning resources, i.e. students write down notes after listening to a podcast but cannot access aggregated learning resources created by other students through peer interaction or ask questions on a difficult task. A high-level engagement where students interact with aggregated learning resources from other students to foster deep learning is desirable.

There is need for peer-to-peer interactions to enhance the learning process. Wagner (1994) defines interaction as a bidirectional event that must involve at least two participating actors. She further indicates that interaction occurs when these actors use the occurring events to mutually influence one another. Interaction between two or more students is crucial for knowledge sharing and collaborations. Jonassen (1991) also affirms that interaction affords access to the value of another person's perspective, which is a major key to the learning process. Dewey (1916) defines interaction as the learning process that occurs when students

receive and translate the information passed to them from another into knowledge with personal application. Bidirectional interactions between students are very crucial and important for learning, as emphasized by (Jonassen, 1991; Wagner, 1994).

Vodcasts allow for a unidirectional interaction this tends to restrict student interactions with peers. A bidirectional interactive system is desirable where students can interact with peers to share and construct knowledge. This interactive system is also desirable to aggregate comments from the students' learning interactions which become a valuable learning resource for students. Opencast Matterhorn (Opencast, 2012) is flexible and reliable recording software. Since 2009, the University of Cape Town (UCT), South Africa, has been experimenting with a move from podcasting to Opencast Matterhorn for lecture capture. Opencast Matterhorn is open-source used to generate lecture recordings, manage existing video and serve different designated distribution channels. The choice of Opencast Matterhorn as a means of recording f2f lectures in UCT tends towards its flexibility and time-saving abilities (Boyinbode, Bagula & Ng'ambi, 2011).

Podcasting works with a variety of tools and programs to produce and distribute content. However, the challenge of using podcasts and vodcasts in higher education is the time to record, edit and upload files to a podcast server. The Opencast Matterhorn offers all these relevant functionalities as a single integration (Boyinbode et al., 2011). In the proposed interactive mobile learning system, students interact with lecture vodcasts recorded by Opencast Matterhorn on their mobile devices.

Most students are ready to adopt m-learning (Traxler, 2007). In South Africa, the mobile device is the only technology most students have, and only have access to computers when they come to university campuses. Mobile devices offer numerous benefits for students in higher education (Crawford, 2007; Motiwalla, 2005). Also m-learning will reinforce f2f

lectures in that students are always with their devices and can re-play the f2f lecture, add comments or read other student comments on their mobile devices after the f2f lecture at their convenience. Ng'ambi (2008a) states that although social usage of mobile devices is very common among students, there has been little evidence to demonstrate how these mobile devices actually contribute to student learning. The proposed interactive mobile learning system will emphasize mobile devices as a tool for enhancing learning among students through a high-level engagement. Deep learning will result from high-level engagement of students with lecture vodcasts on their mobile devices (Dyson, 2011; Hoban, 2010; Litchfield, Dyson, Wright, Pradhan & Courtile, 2010; McLoughlin, Lee & Chan, 2006).

### **1.3 Statement of Problem**

The challenge remains how best to enhance learning in higher education institutions (HEIs) for students with their personal mobile devices. Most HEIs provide resources to students through a learning management system (LMS), which presumes access to computers. At UCT, students access LMS mostly through computers, in other developing countries of Africa i.e. Nigeria, many HEIs do not have a LMS; hence enhancing learning through mobile devices which is prevalent among students becomes viable.

During the last decade, an increase in the use of mobile devices as learning tools has led to an increased number of HEIs exploring the possibilities of the use of these devices in enhancing learning in f2f lectures (Engel & Green, 2011).

In South Africa, the mobile device is the only technology most students have, and only have access to computers when they come to University Campuses. The easy affordance of mobile devices as learning tools makes them indispensable. The fact that most students own mobile devices makes feasible the choice to use m-learning to assist students to improve their learning (Liu, Li, & Carlsson, 2010). The affordance of mobile devices has

made it a viable tool in solving some of the learning problems inherent in HEIs, as judged by its adoption in many institutions (Crawford, 2007; Grant & Gikas, 2011; Keller, 2011).

In HEIs, where students learn in a language other than their own or classes are large, there is low-level engagement in f2f sessions; South Africa is grappling with these challenges, because students are not learning in their mother tongue, or classes are too large, or there is limited time for discussion in class or the f2f lecture is too difficult to follow, especially for students who come from academically challenged background. The result is that they cannot spontaneously ask questions in f2f sessions due to language difficulties (Jaffer et al., 2007; Nzimande, 2009).

M-learning enables students to watch recorded f2f lectures at their own convenience and pace such as while travelling, walking, or waiting for an appointment. Podcasts and vodcasts have emerged as one of the tools aiding this trend (McGarr, 2009). Recording f2f lectures as vodcasts and making these available on mobile devices through an interactive mobile learning tool (mobile lecturing) may help students to engage in high-level interactions after the f2f lectures. Many researchers focus on m-learning usage, adoption and acceptance in higher education (Cheng, Hwang, Wu, Shadiev & Xie, 2010; Cheon, Lee, Crooks & Song, 2012; Haag, 2011; Liu et al., 2010; Lowenthal, 2010; Wang et al., 2009; Wang & Higgins, 2006), but few on how mobile learning engages and can foster deep and meaningful learning. Warburton (2003) defines deep learning as a form of learning where students construct meaning and understanding from learning materials and experiences. The sparse amount of recent research in this area of m-learning provides further evidence of the need for further research.

## **1.4 Purpose of the Study**

To exploit mobile devices owned by students to empower learners, who would otherwise not speak in f2f sessions, and to motivate students to engage with lecture vodcasts and with peers to overcome the low-level engagement prevalent in HEIs, this study will focus on three purposes.

The first is to develop a theoretical mobile lecturing model where students can engage in high-level interactions with lecture vodcasts on their own mobile devices to foster deep learning. The second purpose is to develop a mobile lecturing tool to evaluate the model. The third purpose is to evaluate the mobile lecturing tool using the criteria within the intersections of the model to explore how interactive mobile lecturing engages students to foster deep learning.

## **1.5 Research Questions**

This study is designed to answer the following research questions:

- I. In what ways does mobile lecturing engage learners to foster deep learning?
- II. How do mobile devices enhance students' learning?
- III. To what extent are learner-centred interactions facilitated through a mobile lecturing tool?

## **1.6 Significance of Study**

Advanced capabilities of mobile devices accompanied with a decrease in cost have enabled the mobile phone to become ubiquitous, according to (ITU, 2010); there are now 5.3 billion mobile subscriptions globally, which is about 77 percent of the world's population. Internet statistics in South Africa, 2012 indicates that there are a total of 7, 9 million South Africans that access the Internet on their cell phones (Ross, 2012). Kukulska-Hulme &Traxler (2005) also provides encouraging results for the use of mobile devices to support teaching and

learning. Al-Fahad (2009) in his study revealed the eagerness of students to use their mobile devices to learn.

This study is significant in that it explores the potential of letting students use their personal mobile devices to enhance their learning after the f2f lectures; this can serve to eliminate the cost implications inherent in clickers or classroom response system (CRS), which the institutions involved have to incur to supply students with the devices (Draper & Brown, 2004; Fies & Marshall, 2006). There is a growing body of researchers who are interested in how m-learning engage learners to foster deep learning (Dyson, 2011; Hoban, 2010; Litchfield, et al., 2010; McLoughlin, Lee & Chan, 2006). This study will also be significant as it provides an interactive mobile lecturing tool which facilitates high-level engagement among students to foster deep learning.

This study is also different in that it integrates playing of lecture vodcast on a mobile device and adding of comments in a single space. All the added comments are viewed in another space on the device which becomes an educational learning resource.

The study is expected to inform researchers and educators how mobile devices as an educational tool can enhance learning after the f2f lectures. The study is also expected to inform how mobile devices can assist those having difficulties in understanding the f2f lectures due to language difficulties. Students who had no contact at all with the f2f lectures for one reason or the other will also benefit from this study.

## **1.7 Clarification of Concepts**

The main concepts in this study are Vodcasting, Mobile learning, Mobile lecturing, Engagement and Deep learning. These concepts are defined in the context in which they are used in this study.

### **1.7.1 Vodcasting**

Podcasting is an online audio content that is delivered via an RSS feed. A podcast can be regularly updated and automatically downloaded through software such as iTunes and RSS feeds. In vodcasting VOD stands for “video-on-demand”; the difference from podcasting is that the content is video and not audio (Brown & Green 2006; Copley, 2007).

### **1.7.2 Mobile Learning and Mobile Lecturing**

Mobile device (portable device): A device that can be used to access information and learning materials from anywhere and at any time at the learners convenience (Cheng et al., 2010). Mobile learning can also be defined as “any sort of learning that happens when the learner is not at a fixed, predetermined location or learning that occurs when the learner takes advantage of the learning opportunities offered by mobile technologies” (O’Malley, Vavoula, Glew, Taylor, Sharples & Lefrere, 2003, p. 6). Mobile learning does not have to take place in a fixed location, such as a classroom, or within a specified time, instead learning can occur in any locations and at any time (Sharples et al., 2008). Though students learn on the move with their mobile devices at any time and any place, the role of the educator in the m-learning experiences has remained minimal and in some cases absent, while this is useful, such learning has remained unevaluated. Mobile learning in this study was defined as a type of learning that allows students to engage and learn with mobile technologies when they are on the move with minimal or no involvement of the educator while Mobile lecturing was defined as a form of learning in which students engage in high-level interactions with lecture vodcasts on their mobile devices to enhance their learning with the educator specifying the learning tasks to trigger student learning.

### **1.7.3 Engagement and Deep Learning**

Student engagement refers to a student's desire, need and willingness to participate in learning activities and be successful in the learning process thus promoting higher-level thinking (Carini, Kuh, & Klein, 2006).

Deep learning: Craik & Tulving (1975) explain the level of processing in terms of "depth of processing"; the way in which a person thinks about a piece of information, determines the depth of processing. A shallow level of processing a word would be to skim over a sentence without dwelling on the individual word, while a deeper level of processing, on the other hand, would be to look at the word by itself, outside of a sentence, and to think of what the word means. Warburton (2003) defines deep learning as a form of learning where students construct meaning and understanding from learning materials and experiences. He further indicated that deep learning is dependent on a student's level of engagement with the learning content thus educators must be able to provide an environment where students develop a strong personal interest in learning.

Anderson (2003) indicates that "Deep and meaningful formal learning is supported as long as one of the three forms of interaction (student to teacher; student to student; student to content) is at a high-level" This study defined deep learning based on Warburton (2003) and Anderson (2003) definitions. Deep learning is defined as a learning which occurs when students construct meaning and understanding from learning resources and experiences through high-level interactions.

## **1.8 Research Design**

To address the three research questions (section 1.4), the researcher employed a triangulation approach falling within the qualitative research design, according to Creswell (2009, p. 175), qualitative research tends to collect data consisting largely of words or text from participants.



The meanings of this text are expressed in context rather than in numerical measures (Anderson & Poole, 1998, p.26). Triangulation is the combination of two or more data sources to investigate a research question in order to enhance confidence in the ensuing findings (Bryman, 2004). A triangulation method implemented in this study involved data gathered from three sources; focus group discussions, open-ended questions and interviews across four different case studies. The researcher believed that to fully explore the effectiveness of mobile lecturing to enhancing learning after the f2f lectures, the triangulation approach was adequate. The mode of inquiry in this study involves multiple case studies. Students and teachers of HEIs were mainly involved in the studies. An evaluation took place, where students accessed a mobile lecturing tool (MOBILect) developed by the researcher, using their own mobile devices and qualitative data was acquired through focus group discussions and open-ended questions. Teachers were interviewed and data was acquired through face-to-face interviews. The students who participated for the different case studies were undergraduates. The necessary permission to use the students was obtained from the relevant authorities. The sample selected for this study was both purposeful and convenient. It was purposeful, because students in the selected courses were representative of a large class. According to (Marshall, 96) samples for qualitative investigations tend to be small and an appropriate sample size for a qualitative study is one that adequately answers the research question. Interaction data was retrieved from MOBILect (the tool that was used in this study).

## **1.9 Structure of the Thesis**

This thesis has six chapters. Chapter One addresses background to research, the statement of the problem, purpose of study, research questions, significance of study, clarification of concepts and research design. Chapter Two reviews literature that underpins the study. This chapter reviews f2f learning, how m-learning evolved from f2f learning, distance learning and electronic learning, mobile learning versus electronic learning, f2f

learning versus mobile learning, benefits and limitations of mobile learning, constructivism in mobile learning, mobile learning in higher education, and podcasting and vodcasting adoption in higher education.

Chapter Three describes the interactive mobile lecturing model (MOBLEC) adopted from the FRAME Model (Koole, 2009) and Andersons' six interactions (Anderson, 2003), the design and implementation of a mobile lecturing tool (MOBILect). Chapter Four describes the methodology for this study, and the evaluation of the mobile lecturing tool. Chapter Five explains the findings and interpretation of results of the study based on the MOBLEC model. Chapter Six discusses results obtained, research contributions, implications for teaching and learning, limitations of the study, areas identified for future research, recommendations and review of researcher's experiences.

## **Chapter Two: Literature Review**

### **2.1 Introduction**

Mobile technologies continue to expand at an increasing rate in HEIs in South Africa. Current mobile devices have enabled innovative ideas regarding the effectiveness of the devices not only for the purposes for which they were originally designed, but for learning purposes as well (Clough et al., 2008). Mobile devices have become so ubiquitous and have begun to invade all areas of life, including education. Mobile devices are being used both informally by students who seek their own learning experiences outside formal education settings. The literature review for this study covers the challenges facing learning in HEIs, m-learning, the evolution of m-learning, definitions for m-learning in higher education; m-learning adoption in higher education; limitations and benefits of m-learning; podcasting and vodcasting adoption in higher education.

### **2.2 Challenges facing Learning in HEIs South Africa**

The following m-learning challenges are described: the medium of instruction, large classes, the academic under-preparedness of learners, and the limitation of the traditional m-learning approach.

#### **2.2.1 Challenge of medium of instruction**

A major challenge in South Africa is that it is a society with many different official languages. With the advent of democracy in South Africa in 1994, 11 languages were declared official, although English has become the lingua franca by default. More than 90 percent of South Africans do not speak English as a first language (Census South Africa, 2001). This language diversity is reflected in the student population of South African HEIs (Census South Africa, 2001). “At the University of Cape Town, on average 65 percent of the student population declared English as their first language while 35 percent have home

languages in the other South African official languages and other international languages” (Jaffer et al., 2007, p. 134). English is therefore a second or a foreign language for some South African HEIs students. Some HEIs students from disadvantaged educational backgrounds also have to learn in their second or third language.

Research has shown that to acquire academic language proficiency and academic success in a second language is very difficult (Cummins, 1996; Gee, 1990). HEIs in South Africa adopt English language as a medium of instruction, which make it difficult for students who speak and write English as a second or third language to cope with the face-to-face (f2f) lectures. These students are taught in f2f classes, when students fail to understand the lectures during the once-off f2f session, there is no opportunity to play back or get access to the lecture.

### **2.2.2 Challenge of large class population**

Large classes result from the large numbers of students who enrol at educational institutions. It is also an outcome of the massive enrolment of education, the soaring cost of education and the economics of scale (i.e. it is cheaper to teach 600 students in one lecture by a single lecturer than 30 sessions of 20 students per session).

Large classes limit the interaction of individual students with their teachers, hence preventing the teacher from employing interactive teaching strategies to engage the students in learning (Nicol & Boyle, 2003). Gibbs, Lucas & Simonite (1996) define class size as "small" if containing 30 or fewer students and "large" if containing more than 70 students. Large classes will generally pose a limitation to effective learning for students, and students who are academically under-prepared will be most affected (Jaffer et al., 2007; Haddad, 2006).

### **2.2.3 Challenge of academic under-preparedness**

One of the challenges that face South Africa HEIs is the academic under-preparedness of students (Nzimande, 2009). Most students from disadvantaged educational backgrounds are not adequately prepared to face the challenges in higher education and succeed (Dzubak, 2005; Dzubak, 2009). Academic under-preparedness refers to a student whose academic skills fall below those needed to be successful in higher education (Dzubak, 2005). The major causes of academic under-preparedness in higher education students can be a product of several combined variables; societal and cultural influence, poor economic background, previous academic experience, geographical location and huge differences in race and age (Dzubak, 2005). Code-switching is also prevalent in some secondary schools in South Africa (Moodley, 2001). Code-switching is switching between two or more languages within the context of a single conversation (Duran, 1994), for example teachers use English in combination with other South African languages to teach students and to help the academically challenged students (Moodley, 2001). This code-switching is not implemented in most HEIs of South Africa to assist the academically challenged students. According to Dzubak (2009), many of the under-prepared students often are not aware of their academic deficiency and the need to identify their areas of weakness and strengthen their skills. Hardman & Ng'ambi, (2003) observe that HEI tasks may present certain challenges to academically under-prepared students. The challenge of dealing with academically under-prepared students is further complicated when combined with a large class situation (Jaffer et al., 2007).

### **2.2.4 Challenge of traditional f2f lecture mode of delivery**

In HEIs the teacher-centred f2f approach has been the prominent approach for many years. A traditional teacher-centred f2f approach is a passive mode of teaching, where the teacher is in control of learning and the students sit passively in the classroom to listen (Ayele, Schippers

& Ramos, 2007). This approach often encourages surface learning where “students accept new facts and ideas without critically examining the information and store them as isolated and unconnected items” (Biggs & Tang, 2007, p. 23). A student-centred approach is an active mode where students actively participate in learning and determine their own learning pace which encourages deep learning. O’Neill and McMahon (2005) gather that in a student-centred approach knowledge is constructed by students and the teacher is just a facilitator of learning rather than a presenter of information. Xiaoyan (2003) indicates that a higher level of learning outcomes can be recorded as a result of deep learning. “Deep learning encourages students to critically examine new facts and ideas, combine them into meaningful structures and make numerous links between them” (Biggs & Tang, 2007, p. 24).

Engaging and allowing students to take part in active learning rather than being just passive listeners has been shown in literature to enhance student learning (O’Neill & McMahon, 2005; Prosser & Trigwell, 1999; Ramsden, 1992). Engaging students with interactive learning contents allows them to apply and share knowledge and ideas with each other. In this scenario students will interact with each other to share and cooperate in learning. This exposes students to their peers’ understanding of concepts and also enables the lecturer to test students’ level of understanding (Sixsmith, Dyson & Nataatmadja, 2006; Slain, 2004). Litchfield, Dyson, Lawrence & Zmijewska (2007) observe that it is difficult for teachers to engage students and to participate actively in large f2f classes and to determine their individual level of understanding. It was reported that “A number of students indicated problems such as ‘you can’t ask questions if you’re lost’, or ‘when you miss something, you don’t get a second chance” ((Litchfield, Dyson, Lawrence & Zmijewska, 2007 p. 592). They further observe that f2f interactions, such as replying to questions, or raising hands to answer questions are not always effective because students indicated that they would not volunteer to

answer questions in a large class for fear of being ridiculed by peers when their answer is wrong or foolish or because of incorrect use of English expressions.

Slain (2004) indicates that these prevailing problems of f2f can be solved through engagement with mobile devices. Thornton & Houser (2005) explore the effectiveness of mobile phones in language learning for Japanese students. It was observed that students who used mobile phones had more vocabulary gains than those that used personal computers or paper materials. Kukulska-Hulme & Shield (2008) remark that most Mobile-Assisted Language Learning (MALL) activities appear to make use of mobile phones; most of these activities employ text messaging for vocabulary learning (Norbrook & Scott, 2003; McNicol, 2004; Pincas, 2004). Ng'ambi (2005) uses SMS to address educational challenges of academic under-prepared students and large class sizes. Ng'ambi (2008b) implements reflective learning through podcasting to assist students with language barriers.

### **2.3 Face-to-Face Learning**

Face-to-face (f2f) learning has been the foundation of other types of learning (distance learning, electronic learning and mobile learning). F2f learning significantly pre-dates the earliest documented distance learning efforts (Williams, 2009). F2f is the delivery method that has traditionally been, and will most likely continue to be. F2f learning takes place in classrooms where the teacher presents the learning material to students. The students must be physically present to participate in the learning process. This form of learning has the advantage of maintaining a direct contact between the teacher and students, but has many limitations; for instance, if a student misses a class due to an illness, he or she will miss the learning instructions. Or if the student has no opportunity to take part in some lesson, he or she will miss the training instructions.

### **2.3.1 Comparison of F2F Learning and M-Learning**

Prosser and Trigwell (1999) indicate that f2f learning lacks the ability to deliver deep and reflective learning; apart from the fact that f2f learning is teacher-centric where the students are passive listeners, the limited time for f2f learning is also a limitation because students cannot engage in high-level interactions within this time frame. Abdullah & Noor (2010) observe the differences between the conventional f2f learning environments and m-learning environments using eight parameters: location, time, resources, role, evaluation, medium of instruction, planning and instructional design to highlight the benefits of m-learning (see Table 2.1).

F2F learning occurs mainly in the classroom and within a specific time while m-learning can take place anywhere and at any time. In f2f learning, interaction between students and teacher is limited to specific time and specific location while learning interactions in m-learning can take place anywhere and anytime. In f2f learning, resources may be limited to print forms like books while m-learning offers access to different digital information. Teachers are in control of f2f learning while in m-learning students are in control of learning; teachers mainly provide support to motivate learning outside the classroom (Hoven, 1999; Kukulska-Hulme, 2010; Pulist, 2001).

## **2.4 Evolution of Mobile Learning**

The affordances of mobile devices have encouraged an increasing number of studies to embrace m-learning (Clough et al., 2008). Students can access f2f lectures in an m-learning environment. M-learning has shown some comparative advantages over f2f learning and e-learning empowered by the affordances of mobile devices (Crawford, 2007; Heiphetz, 2011).



Table 2.1: Difference between conventional (f2f) learning environment and m-learning environment

Source: Abdullah & Noor (2010)

	Conventional School Environment	M-learning Environment
Location	Learning normally occurs at fixed classroom at specific time slots.	Learning environment is no longer fixed.
Time	Interaction between teacher and students is face-to-face and limited to specific time and physical space	Interaction is no longer confined to a fixed time but can be accessed at different times both synchronous and asynchronous.
Resources	Resources depend on printed materials i.e. books, manuals etc. Where knowledge is acquired from these resources.	Resources are accessed through mobile devices. Access is no longer limited to just print forms but to unlimited resources.
Roles	Teachers are mainly the knowledge giver or guardian of knowledge whereas students receive the knowledge.	Teachers mainly assume the role of facilitators. Students are in charge of their learning and collaborate to achieve the learning experience.
Evaluation	Examination and assignments may be used to gauge students' progress and achievement based on knowledge delivered to students.	Evaluation of student could be conducted individually or as a whole group according to the instructor or on mutual basis as the students and the instructor are no longer confined to time and space boundaries.
Medium of Instruction	The medium for instruction is very much dependent on the advances in technology as well as what is feasible for a normal educator with available resources.	
Planning	Carefully planning is required to ensure changes in location, time and roles are fully utilised to achieve this medium of instruction.	
Instructional Design	Instructions now have to be strategized to include the potential of the medium of instruction as well as meeting the course goals and objectives. It is then the responsibility of the instructor to help facilitate and design the information to ensure students would achieve the goals set for the course as well as meeting their individual goals.	

M-learning has evolved since 1970s and has spread widely to today. It has its roots in d-learning (distance learning) and e-learning (electronic learning) (Georgiev, Georgieva & Smrikarov, 2004) (See Figure 2.1). D-learning is defined “in its most basic form as a form of learning occurring when the student and the instructor are logistically separated; d-learning has transformed into e-learning which subsequently evolved to m-learning. D-learning strategies have gradually evolved into today’s m-learning” (Georgiev et al., 2004).

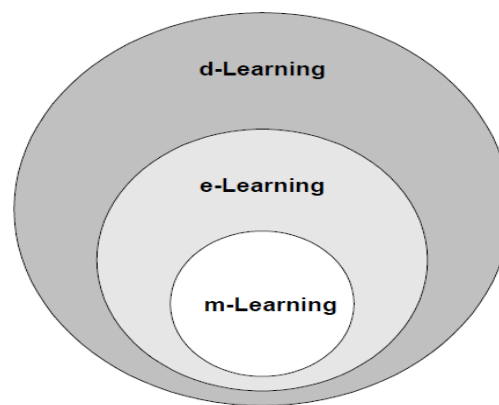


Figure 2.1: The place of m-learning as part of e-learning and d-learning

*Source: Georgiev et al., 2004*

The reliance of d-learning on electronic devices came to be known as e-learning. In turn, e-learning has given way to m-learning. The difference between m-learning and e-learning has been revealed in some studies (Laouris & Eteokleous, 2005; Sharma & Kitchens, 2004). In Table 2.2, Sharma & Kitchen (2004) affirm the advantages of m-learning over e-learning for learning. They describe four crucial elements for learning interaction in HEIs: pedagogical changes, student-to-student communication, instructor-to-student communication, and feedback to students, which can easily be implemented in m-learning irrespective of time or space. In pedagogical changes, learners may learn with lecture vodcasts on their mobile devices, learning can occur in a fixed place or when the learner is mobile. In instructor-to-student communication, there is an interactive communication between students and their

instructor. In student-to-student communication, there is rich communication due to one-to-one communication. In feedback to students, customized instructions are sent to students from instructor to correct any misconception.

Table 2.2: e-Learning versus m-learning

Source: Sharma & Kitchens, 2004

<b>Current e-Learning Methods</b> More Text-based and Graphic based instructions Lecture in classroom or in internet labs	<b>Pedagogical Changes</b> <b>M-Learning (Wireless)</b> More Voice, Graphics and Animation based instructions Learning occurring in the field or while mobile
<b>Instructor to Student Communication</b>	
<b>Current e-Learning Methods</b> Time-delayed e-mail (students need to check e-mails or web sites for communication) Passive communication asynchronous	<b>M-Learning (Wireless)</b> Instant Announcement of e-mail delivery (As soon as e-mail or communication arrives, students are informed through instant messaging) Instant communication Interactive Spontaneous
<b>Student to Student Communication</b>	
<b>Current e-Learning Methods</b> Face-to-Face Audio-teleconference is quite common e-mail-to-e-mail Private Location travel time to reach to internet site Dedicated time for any group meeting Poor communication due to group consciousness	<b>M-Learning (Wireless)</b> Flexible Audio-teleconference and Video-teleconference both would be possible 24/7 instantaneous No geographic boundaries no travel time since wireless internet connectivity Flexible timings on 24/7 basis Rich communication, due to one-to-one communication, reduced inhibitions
<b>Feedback to Students</b>	
<b>Current e-Learning Methods</b> 1-to-1 basis Asynchronous and at times delayed Mass/standardized instruction Benchmark-based grading  Simulations & lab-based experiments paper-based	<b>M-Learning (Wireless)</b> Asynchronous and Synchronous both customized instruction Performance & Improvement-based grading  Real-life cases and on the site experiments less paper, less printing, less cost

In Table 2.2 the advantages of m-learning over e-learning are emphasized. M-learning enhances interactions between students and learning content, student and student, and students and teacher. Access to learning resources from anywhere and anytime and also feedback to students from instructors are characteristics of m-learning.

### **2.4.1 Understanding Mobile learning**

There is need to properly understand m-learning. The inability of researchers to arrive at a common definition for m-learning suggests that m-learning is still in an evolutionary phase (Peng, Su, Chou & Tsai, 2009). To better understand m-learning, researchers need to agree on well-grounded definitions that take into account all specific areas of the learning process (El-Hussein & Cronje, 2010). A good reason why an agreed “definition” of m-learning has not yet been arrived at is that most definitions and understandings of m-learning only take into account the mobile technologies being used, rather than the experience of learners while learning with mobile devices (Traxler, 2007).

Mobile learning does not have to take place in a fixed location, such as a classroom, or within a specified time, instead learning can occur in any locations and at any time (Sharples et al., 2008). M-learning has the potential to support all forms of education; higher education is a particularly appropriate venue for the integration of student-centred m-learning because mobile devices have become ubiquitous on college campuses (Crawford, 2007). Cheon et al. (2012) highlighted four types of learning approaches supported by mobile devices and prominent in higher education: Individualized learning, allowing students to pace learning at their own speed. Situated learning, this is realized when students use mobile devices to learn within a real context. Collaborative learning, when students use mobile devices to interact and communicate with other students. Informal learning, realized when students learn outside of the classroom at their convenience. Mobile devices can be used both inside and outside the classroom for learning.

The f2f learning is also time specific, hence not allowing for more interaction by the students. Exploration of m-learning outside the classroom is considered where students will have ample time to interact with their mobile devices. M-learning outside the classroom gives the students more time to cooperate in informal learning. Researchers have indicated that m-

learning can promote cooperative learning (Johnson, D., Johnson, R. & Stanne, M, 2000; Wyatt, Krauskopf, Gaylord, Ward, Huffstutler-Hawkins & Goodwin, 2010). Interactions with students who possess relevant knowledge allow them to gain information from one another and promote critical thinking, retention and knowledge re-creation (Johnson et al., 2000 Wyatt et al., 2010). The next section describes various definitions and facts about m-learning as stated by popular researchers of m-learning which are applicable to learning in higher education.

Ally (2004) defines m-learning as “the delivery of electronic learning materials on mobile computing devices to allow access from anywhere and at any time” (p.1). O’Malley et al. (2003) define m-learning as “any sort of learning that happens when the learner is not at a fixed, predetermined location or learning that happens when the learner takes advantage of the learning opportunities offered by mobile technologies” (p.6). Ozdemir (2010) describes mobile devices as technologies that are handy and can be carried about easily by learners. Geddes (2004) says m-learning is concerned with the acquisition of knowledge and skills through the use of mobile technologies anywhere and anytime. Attewell (2005) presents the advantages of mobile learning, which seems to emphasize collaboration of learners, informal learning experience, personalisation of learning and an enhanced engagement of learners, and defines “mobile learning” as unique in that it allows learning to take place anywhere and anytime. In addition, mobile learning can be used to encourage both independent and collaborative learning experiences.” Attewell (2005) reports that “mobile learning helps to remove some of the formality of f2f learning and engages passive students” Kukulska-Hulme (2006) notes that mobile learning technologies have ceased to be used by only experts in the field but now teachers and students have started to integrate them into their daily teaching and learning. (Naismith, Lonsdale, Vavoula & Sharples, 2004), in their literature review of

mobile technologies and learning, assert the significance of mobile technologies and learning and make references to some existing learning theories such as constructivism, behaviourism, problem-based learning, situated learning and collaborative learning, and how they apply to mobile learning. Naismith et al., (2004) write that “learning will move away from classroom into the learner’s environments, becoming more situated, personal, collaborative and lifelong.” Sharples, Taylor & Vavoula (2007) in their theory of mobile learning also suggest that a theory of mobile learning must be tested against the following criteria: Is it significantly different from current theories of classroom, workplace or lifelong learning? Does it account for the mobility of learners? Does it cover both informal and formal learning? Does it theorise learning as a constructive and social process? Does it analyse learning as a personal and situated activity mediated by technology? Sharples et al. (2008) define the research of mobile learning as a process that investigate how the mobility of learners assisted by mobile and social technologies can lead to individuals gaining experience, expertise, knowledge and skills. El-Hussein and Cronje (2010) describe mobile learning as a learning activity that makes sense when the technology in use is fully mobile as well as the users of the technology. El-Hussein and Cronje (2010) believe that the mobile learning environment is based on the mobility of learners, the mobility of technology, and the mobility of learning which broaden the scope of the higher educational landscape.

Looking at all these definitions and facts about m-learning, three things are clear: M-learning allows learning to take place anywhere and at any time at learners’ convenience through the affordances of mobile technologies; m-learning allows learning in informal settings i.e. outside the classroom; and m-learning allows learners to cooperate and collaborate in learning both formally and informally. Based on definitions of m-learning by (Sharples et al., 2008; Crawford, 2007; Ally, 2004; Naismith et al., 2004); m-learning has the

potential to support higher education students in learning especially in learning scenarios where students engage in learning outside the f2f learning with their mobile devices.

Based on all these relevant definitions and facts about m-learning, m-learning in this study will be defined as a type of learning that allows students to engage and learn with mobile technologies outside the classroom. In this definition, m-learning is emphasized as a tool for interaction among peers. Nevertheless all that glitters is not gold; the use of mobile devices for learning has some apparent limitations.

#### **2.4.2 Limitation Of M-learning**

Wang and Higgins (2006) classify the limitation of mobile-phone learning into three main types: psychological, pedagogical and technical limitations. These limitations are discussed extensively by researchers (Haag, 2011; Huan, Kuo, Lin & Cheng, 2008; Lowenthal, 2010; Park, 2011; Wang & Higgins, 2006; Wang, Wu, & Wang, 2009). Technical limitations of mobile phones include slow network speeds, small storage capacity, small screens and lack of standardization and compatibility (Haag, 2011; Huan et al., 2008; Cheng et al., 2010; Lowenthal, 2010; Park, 2011; Wang & Higgins, 2006).

Psychological limitations mean learners are more likely to use their mobile phones for listening to music, playing games and doing other leisure activities during their spare time than getting engaged with learning tasks (Wang & Higgins, 2006; Wang, Wu, & Wang, 2009). Pedagogical limitations also mean learners may lack the motivation to complete learning tasks on schedule for lack of a firm framework and time planning for informal m-learning.

### **2.4.3 Benefits of M-Learning**

The affordances of mobile devices make them a very useful tool for m-learning despite their apparent limitations (BenMoussa, 2003; Churchill & Churchill, 2008; Klopfer, Squire & Jenkins 2002; Sharples, 2000):

(a) Portability: The devices are small so they can be carried anywhere and learning is available to the learner anywhere.

(b) Instant connectivity: Mobile learners have access to information anywhere by instant connection. In recent times m-learning technologies are used not only by experts, but these technologies are now being integrated into teaching and learning by students and teachers in higher education (Kukulska-Hulme, 2006).

Attewell, Savill-Smith and Douch (2009) further elaborate in detail on some benefits inherent in using mobile technologies for teaching and learning: M-learning makes learning more accessible, convenient, and adaptable to learners' needs and environment. It makes learning interesting, enjoyable and more attractive to learners. It helps teachers to provide and adapt to learning styles and preferences of students. It enables teachers to maintain a bidirectional dialogue (synchronous and/or asynchronous) with learners regardless of their location. It gives technological support for teaching and learning in the f2f lectures (which normally occur in a classroom). It improves access to learning resources and materials for learners from any location. It encourages and supports both independent and collaborative learning. It aids revision and helps learners who have missed any lessons to catch up. It improves and ensures quality feedback to learners during learning.

Heiphetz (2011) also explores more benefits of m-learning: It allows learners the freedom of planning their learning at their own convenience. It increases knowledge creation and retention and saves time. It has also been shown that m-learning has helped learners to retain more of the learning contents they interact with when using m-learning units in



conjunction with f2f learning (Fozdar & Kumar, 2007; McKinney, Dyck & Luber 2009). M-learning makes learning easier, motivates further learning and encourages knowledge gathering after the f2f learning (Norbayah & Norazah, 2007). Using mobile devices to access course materials has been shown to increase convenience and flexibility for taking courses by distance learning (Ally, Lin, McGreal, Woo & Li, 2005; Ally & Stauffer, 2008).

## **2.5 Constructivism in M-learning**

The rising interest in mobile learning is spearheaded by two major developments. First is the proliferation of mobile technologies with enhanced technological enrichments, such as context awareness, instant connectivity and multimedia presentations (video, images, text and audio). Another development is the importance of learning in an informal context as a continuation of the formal education; this development relates to the constructivist principle (Woo & Reeves, 2007; Pear & Crone-Todd, 2002).

“According to social constructivism, the individual learns early on, even as language development begins, to construct his or her knowledge and meanings through interaction with others” (Pear & Crone-Todd, 2002, p.222). Social constructivism is based on the notion that learning takes place through collaboration, communication and negotiation of meaning within the learning community. The implications of the conversations inherent in learning through social constructivism has given rise to the potentiality of using mobile devices to enhance learning in higher education and to promote deep and meaningful learning opportunities (Anderson 2003; Woo & Reeves, 2007).

## **2.6 M-Learning in Higher Education**

Cheon et al. (2012) observe that mobile devices have become prevalent among students in higher education. This type of motivation has actually boosted m-learning in higher education. El-Hussein and Cronje (2010) explain the concept of m-learning in higher education in terms of mobility of technology, mobility of learner and mobility of learning;

They further observe that this trifold of mobility are very crucial in making mobile devices viable as a medium of delivery for higher education instructional contents (see Figure 2.2). A mobile learner can learn on the go with their mobile devices as they move from formal learning to informal learning.

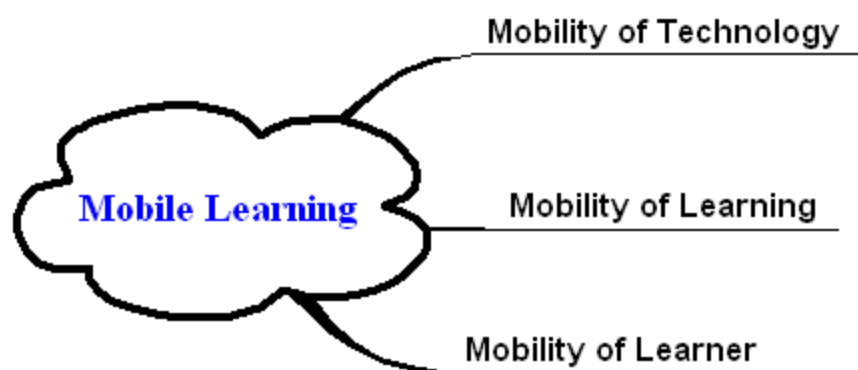


Figure 2.2: The three concepts of mobile learning in higher education

*Source: El-Hussein & Cronje, (2010).*

M-learning enables learners to listen to lecture podcasts at their own convenience and pace, such as when commuting, exercising, or waiting for an appointment. Many researchers have carried out studies to determine academic effectiveness of podcasting in achieving m-learning in higher education (Abdous, Camarena & Facer, 2009; Abdous, Facer & Yen, 2012; Copley, 2007; Evans, 2008; Larkin, 2010; Lee & Chan, 2007; Walls, Kucsera, Walker, Acee, McVaugh, & Robinson 2010).

## 2.7 Podcasting in Higher Education

The practice of podcasting lectures is a growing trend and is holding attraction for both lecturers and students of higher education (Herrington, A. & Herrington, J, 2007). Podcasting is the process of making audio files accessible to listeners, via the internet or a computer network from where they can be downloaded onto an iPod or other player (Edirisingha, Hawkrigge & Fothergill, 2010). In podcasting users subscribe to a podcast feed; podcasts are automatically pushed to the RSS reader or aggregator (RSS, 2002) (for example. iTunes,

iTuneU). Even if a learner with a portable device is disconnected from the internet for a certain period, a podcast can still be pushed to the device immediately it reconnects. Learners choose the most suitable time and venue to listen to podcasts or watch vodcasts (Video podcasts). For example, a learner can listen to podcasts while walking to campus (Boyinbode et al., 2011). Evans (2008) observes in the study he conducted to determine the effectiveness of mobile learning in the form of podcasting for business course university students; that students found podcasts to be more preferable to their textbook as a learning aid. The general passive role of students in most f2f lectures emphasises the need for more student-centred learning strategies (McGarr 2009).

The evolution of digital technologies like podcasting and vodcasting are opening up many possibilities. Many researchers argue that lectures are not a particularly effective means for enhancing student-centred learning (Lee & Chan, 2007; McGarr, 2009; Copley, 2007; Oliver & Luca, 2007). Biggs (2003) argues that lectures may take an interactive or an expository form and they differ in their level of learners' engagement. Teachers use f2f lectures to present content and information to learners, so the lectures are usually didactic and lack ability to engage learners (low-level interaction). Though there have been a number of attempts to use technology to enhance learner engagement, the effectiveness of any technology for enhancing learner engagement depends entirely on how the learners make adequate use of the technology to construct knowledge (Oliver & Luca, 2007).

Podcasting has seen significant growth in education in recent times by its ability to support mobile learning and enhance student's learning experience (McGarr, 2009; Ng'ambi, 2008a). Some researchers of podcasting indicate the following benefits of podcasting in higher education: Larkin (2010) suggests that recorded lectures "support the transformative nature of learning". Walls et al. (2010) indicate that podcasting can enrich students' learning experience and motivation to study. Heilesen (2010) affirms that podcasting can have a

good impact on the academic community; it provides students with a new tool to supplement their study activities. Copley (2007) observes that the most common use of podcasts in the universities is for the distribution of lecture recordings to enhance student reviewing and revision. This suggests that the podcasts in this context are used in a unidirectional manner similar to the f2f approach, which tends to reinforce didactic teaching approaches that are unidirectional, a one-way interaction between teacher and students (see Figure 2.3). Figure 2.3 shows the similarity between the traditional lecture mode and podcasting mode in both cases where teacher broadcast information to the students (unidirectional).

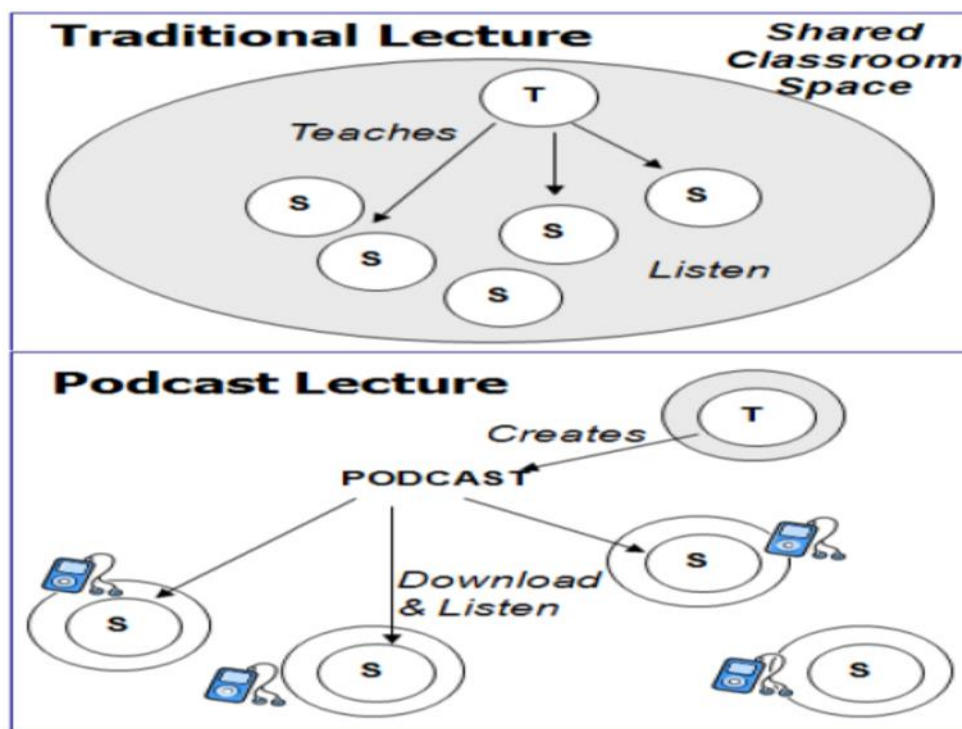


Figure 2.3: Similarities between podcast lecture and traditional lecture

Source: Litchfield et al. (2010)

Though podcasting enables students to repeatedly listen to and write down the lecturer's words (Tynan & Colbran, 2006), it is a repetitive learning strategy and therefore still fits into a behaviourist paradigm (unidirectional) (Herrington, A. & Herrington, J. 2007). Apart from

this limitation of podcasting, the challenge of using podcasts and vodcasts in higher education is that it requires the educator's time to record, edit and upload files to a podcast server (see Figure 2.4.). In Figure 2.4 the process of podcasting is as follows: i. Author creates and edits audio/video file. ii. Publish audio/video file to server. iii. Request subscription. iv. Deliver audio/video file. 5. Synchronise with multimedia player. Many initiatives have come up in the form of recording f2f lectures such as Opencast Matterhorn (Opencast, 2012), Virtual presenter (Ketterl et al., 2006), OpenEyA (OpenEyA, 2012), The E-Chalk project (Friedland et al., 2004) and Tele-task (Wolf et al., 2007). University of Cape Town (UCT), South Africa is already exploring lecture recording in the form of podcasting and vodcasting (Ng'ambi, 2008b; Ng'ambi, 2010). Opencast Matterhorn is a recording initiative recently embraced by UCT because it provides a more flexible and time saving alternative for recording podcasts and vodcasts (Boyinbode et al., 2011).



Figure 2.4: Podcasting model

Source: Abdous et al. (2009)

### 2.7.1 Opencast Matterhorn

Opencast Matterhorn automates the recording and distribution of podcasts and vodcasts (Ketterl, Schulte & Hochman, 2010; Opencast, 2012). In recent times Opencast Matterhorn

has been embraced in University of Cape Town, South Africa as a new way of recording and distributing lectures. Opencast Matterhorn includes the following features (See figure 2.5):

**Lecture Capture and Administration:** Scheduling recording, automating recordings, uploading existing recordings, managing metadata, captioning and processing functions. Integration with recording devices in the classroom for managing automated capture.

**Ingest and Processing:** Services that prepare and package the media files according to configurable specifications, i.e. video encoding.

**Distribution Management:** Manages the local streaming and download servers. The feed distribution channel provides an easy endpoint for integration with any third-party system wanting to connect to Matterhorn. The implementation of the service is straight-forward, copying the distribution media files to local download and/or streaming servers and creating an RSS and/or Atom feed out of the static metadata of the media package.

**Engage Tools:** Rich media-user interface for learners to engage with content, including in-video text search, slide preview, content-based search and captioning.



Figure 2.5: Opencast Matterhorn features

Source: [www.opencast.org](http://www.opencast.org)

The Opencast Matterhorn main page (see Figure 2.6) shows the features of Opencast Matterhorn latest version 1.3.



Figure 2.6: Opencast Matterhorn main screen

Source: [www.opencast.org](http://www.opencast.org)

Opencast Matterhorn schedules single-course recording or group recordings. The following fields are required for the scheduling (see Figure 2.7): Title of course, name of presenter, course series, start date for the recording, the start time of recording, duration of recording and the processing instructions.

**Admin Tools**

**Schedule Recording**

Single Recording  
Group of Recordings

\* Title:   
 Presenter:   
 Course/Series:

**Additional Description**

**Capture**

\* Start Date: 2012-07-28  
 \* Start Time: 14:00  
 \* Duration: 0 hour(s) 0 minutes  
 \* Capture Agent: Choose one:  
 \* Input(s):

**Processing**

\* Processing Instructions: Encode, Analyze, and Distribute  
 Hold: Processing should be paused to allow for:  
☐ Review / Trim before encoding (with option to edit info)  
 Distribution: \* Distribution Channel(s): ☒ Matterhorn Media Module ☐ Youtube ☐ iTunesU  
 License:

Schedule Cancel  
 \*Required

Figure 2.7: Scheduling lecture recording in Opencast Matterhorn

Source: [www.opencast.org](http://www.opencast.org)

Opencast Matterhorn shows the details of recording when in progress (see Figure 2.8), the status of the processing and actions that can be performed on the recording.

**Admin Tools**

**Recordings** Series Capture Agents Statistics

Schedule Recording Upload Recording

All (9) Upcoming (0) Capturing (0) Processing (0) Finished (8) On Hold (1) Failed (0)

Title	Presenter	Course/Series	Recording Date&Time	Status	Action
prueba	bflores	prueba	Thu, May 10 2012 - 02:26 Duration: 00:09:57	On Hold : Waiting for user to review / trim recording	View Info   Ignore Review / Trim
Example Capture			Tue, Jun 26 2012 - 16:32 Duration: 08:00:00	Finished	View Info   Play
Unscheduled-demo_capture_agent-1340721170628			Tue, Jun 26 2012 - 16:34 Duration: 00:01:51	Finished	View Info   Play
1111			Wed, Jun 27 2012 - 03:39 Duration: 00:00:15	Finished	View Info   Play
deho			Wed, Jun 27 2012 - 04:23 Duration: 00:00:22	Finished	View Info   Play
demo2	Quang	Khoa hoc demo	Wed, Jun 27 2012 - 04:25 Duration: 00:00:31	Finished	View Info   Play
demo3	Quang	Khoa hoc demo	Sat, Jun 30 2012 - 22:52 Duration: 00:00:30	Finished	View Info   Play
yemi	test	test	Mon, Jul 02 2012 - 11:03 Duration: 01:04:42	Finished	View Info   Play
Video test					

Update table every 5 seconds. Show 10 Recordings per page.

<<first <previous 1 of 1 next> last>>

Figure 2.8: Lectures recording in Opencast Matterhorn

Source: [www.opencast.org](http://www.opencast.org)



Matterhorn has a flexible feature that allows existing recordings to be uploaded (see Figure 2.9).

Figure 2.9: Uploading existing lecture recording into Opencast Matterhorn  
Source: [www.opencast.org](http://www.opencast.org)

## 2.8 Summary

This literature review has shown that m-learning has the potential of fostering interaction and deep learning among students in higher education institution (HEIs). A teacher becomes more like a tutor in m-learning scenarios (O'Neill & McMahon, 2005). As f2f learning evolves into m-learning, the role of learning changes from a teacher-centred paradigm to a student-centred paradigm; here the students are in control of learning, enabling them to learn at their own pace and to effectively construct their own knowledge using mobile devices (Litchfield et al., 2010; Dyson, 2011). The students can engage with learning tasks and interact with other peers; they construct knowledge and reflect on thoughts and experiences (Ahonen, Joyce & Turunen, 2003; Herrington & Oliver, 2000; Herrington, A & Herrington, J 2006; Herrington, A. & Herrington, J. 2007).

The following chapter describes the proposed mobile lecturing model (MOBLEC) adopted from Anderson educational interactions (Anderson, 2003) and FRAME model (Koole, 2009). The proposed model seeks to enhance learning through high-level engagement among students and teachers of HEIs. The chapter also describes the design and implementation of a mobile lecturing tool “MOBILect” which is used to evaluate the proposed model (MOBLEC).

University of Cape Town

## **Chapter Three: Mobile Lecturing Model**

### **3.1 Introduction**

This study proposes an Interactive Mobile Lecturing Model (MOBLEC). This model aims to use mobile lecturing to foster deep learning outside the f2f lectures through students' high-level engagement with lecture vodcasts on their mobile devices. In this chapter, Anderson's six types of educational interactions (Anderson, 2003) are integrated into FRAME (Koole, 2006, 2009) to form the MOBLEC model; the reasons for the merger are explained. MOBILect a mobile lecturing tool based on MOBLEC model is also designed and implemented in the chapter.

Peer communication and interaction is critical for learning communities, and the value of another person's perspective, usually gained through interaction, is a key learning component in constructivist learning theories (Jonassen, 1991). This aspect of interaction is crucial and important to student learning in order to foster deep learning (Lipman, 1991; Wenger, 2001; Jonassen, 1991). Anderson (2003) describes the six types of educational interaction that are crucial for learning. He argues that "deep and meaningful formal learning is supported as long as one of these three forms of interaction is at a high level" (student-to-teacher; student-to-student; student-to-content).

The suitability of the FRAME model for this study stems from the use of this model as an existing m-learning model. The FRAME model was used to evaluate the potential and suitability of mobile devices as distance learning tools (Koole, 2006, 2009).

### **3.2 Role of Interaction in Learning**

Interaction can be described in terms of the participating actors. Michael Moore discussed the three most prevalent forms of interaction in distance education: student-to-student, student-to-teacher, and student-to-content (Moore, 1989). Anderson & Garrison (1998) further

expanded the list to include teacher-to-teacher, teacher-to-content, and content-to-content interaction. Garrison (1988) expresses the need for a balance between teacher-centred approach prevalent in f2f learning and learner-centred approach in learning environment. Garrison (1989) also argues that bidirectional communication is crucial and allows learners to construct meaningful knowledge. Dewey (1916) defines interaction as the learning process that occurs when students receive and translate the information passed to them from another into knowledge with personal application. Bidirectional interactions between students are very crucial and important for learning.

Table 3.1: Types of interactions in learning environments

Source: Ngwenya et al., (2004)

	Same place	Different place
Same time	1	2
Different time	3	4

Using the schema in Table 3.1, Ngwenya, Annand & Wang (2004) argue that distance learning can only take place in space 2 (same time, different place) and space 4 (different time, different place). It is in these spaces that teaching and learning activities occur with technologies that facilitate synchronous online learning (space 2: desktop video conferencing, chat and audio-conferencing). Asynchronous technologies (space 4: computer conferencing, e-mail). For m-learning approach taken in this study students can interact in space 1, space 2, space 3 and space 4. In space 1, students interact in the same place at the same time. In space 2, students interact in different places at the same time. In space 3 students interact in the

same place but at a different time. In space 4, students interact in different places at different times.

### 3.3 FRAME Model

The Framework for the Rational Analysis of Mobile Education (FRAME) model describes the relationships among learners, their social interaction and the influence of mobile devices on these relationships. The suitability of the FRAME model for this study stems from the adoption of this model as an existing m-learning model. The FRAME model describes a mode of learning in which learners may participate and interact synchronously and asynchronously in learning.

Koole (2006, 2009) developed the FRAME model (see figure 3.1). The model shows the effectiveness and suitability of mobile devices for social interaction and learning and offers insights into how mobile learning can be effectively implemented in both formal and informal learning. It emphasises constructivism and learning through mobile technologies.

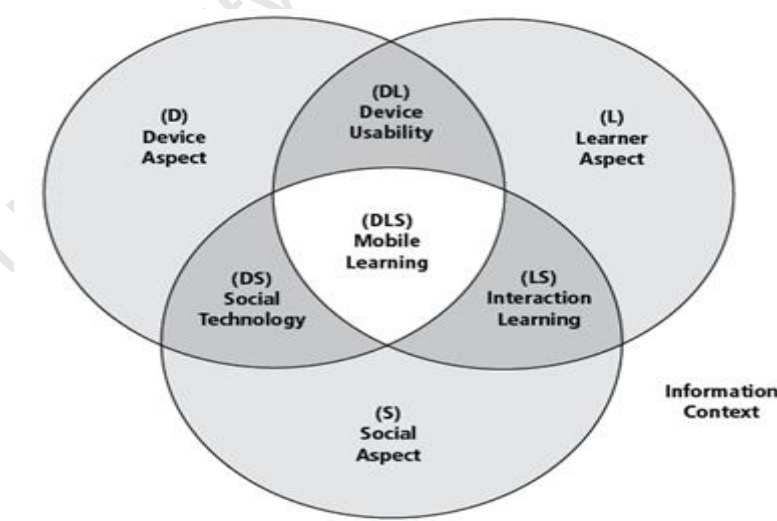


Figure 3.1: FRAME

Source: Koole (2009)

The FRAME model is illustrated in Figure 3.1 by a Venn diagram where three aspects are described. The three circles represent the Device (D), learner (L), and Social (S) aspects. The intersections where two circles overlap contain attributes that belong to both aspects. The attributes of the Device Usability (DL) and Social Technology (DS) intersections describe the affordances of mobile technology (Norman 1999). The intersection labelled Interaction Learning (LS) contains instructional and learning theories with an emphasis on social constructivism. All three aspects overlap at the Primary Intersection (DLS) in the centre of the Venn diagram (Koole, 2009).

#### **Device Aspect (D):**

The device aspect (D) refers to the physical, technical, and functional characteristics of a mobile device. The physical characteristics include input and output capabilities as well as processes internal to the machine such as storage capabilities, power, processor speed, compatibility, and expandability.

#### **Learner Aspect (L):**

The learner Aspect (L) takes into accounts an individual's cognitive abilities, memory, prior knowledge, emotions, and possible motivations.

#### **Social Aspect (S):**

The Social Aspect takes into account the processes of social interaction and cooperation.

#### **Device Usability Intersection (DL):**

The device Usability Intersection contains elements that belong to both the Device (D) and Learner (L) aspects. This section relates characteristics of mobile devices to learner characteristics, cognitive tasks related to the manipulation and storage of information.

#### **Social Technology Intersection (DS):**

While the Device Usability intersection (DL) in the FRAME model describes the relationship between one learner and a device, the Social Technology intersection (DS) describes how

mobile devices enable communication and collaboration among multiple individuals and systems using the technical capabilities of the mobile device. It refers to networking capacity, connectivity and collaboration tools.

### **Interaction Learning Intersection (LS):**

The interaction Learning Intersection (LS) represents learning and instructional theories that are dependent on social constructivism.

### **Mobile Learning Process (DLS):**

Effective mobile learning, the primary intersection of the FRAME model, results from the integration of the Device (D), learner (L), and Social (S) aspects. Mobile learning provides enhanced collaboration among learners, access to information, and a deeper contextualization of learning. The primary intersection, a convergence of all three aspects, defines a mobile learning situation. Effective mobile learning process facilitates mediation, reflection information access, selection and navigation so that appropriate information is accessed. Mobile learning occur with minimal or no educator involvement in specifying learning tasks.

In the FRAME model only the aspects and intersections related to device hardware and software characteristics for the Device aspect, Device Usability intersection and the social technology intersection were applied, pedagogy and learning involved in the interaction learning intersection were not directly applicable to Koole's investigations. Kenny, Park, Van Neste-Kenny, Burton & Meiers (2009), in their application of FRAME model to nursing education, were able to implement the device usability but not the social interactions which involve peer communication using mobile devices due to the problem of connectivity and the students' unfamiliarity with their mobile devices. Palmer and Dodson, (2011) used the combination of mobile device and pedagogical approach which correlate with FRAME Koole's (2009) to develop Oregon Rural scholars program (ORPH) distance learning. Kumar, Jamatia, Aggarwal & Kannan (2011) use the FRAME model in their study

to explore the effect of mobile devices for student support services and to gauge its use for enhancing learning.

### 3.4 Anderson Educational Interactions

Anderson's six types of educational interactions (Anderson, 2003) are integrated into FRAME (Koole, 2006, 2009) to form MOBLEC model. Anderson (2003) describes the six types of educational interaction that are crucial for learning (see Figure 3.2). The six types of interactions are described below.

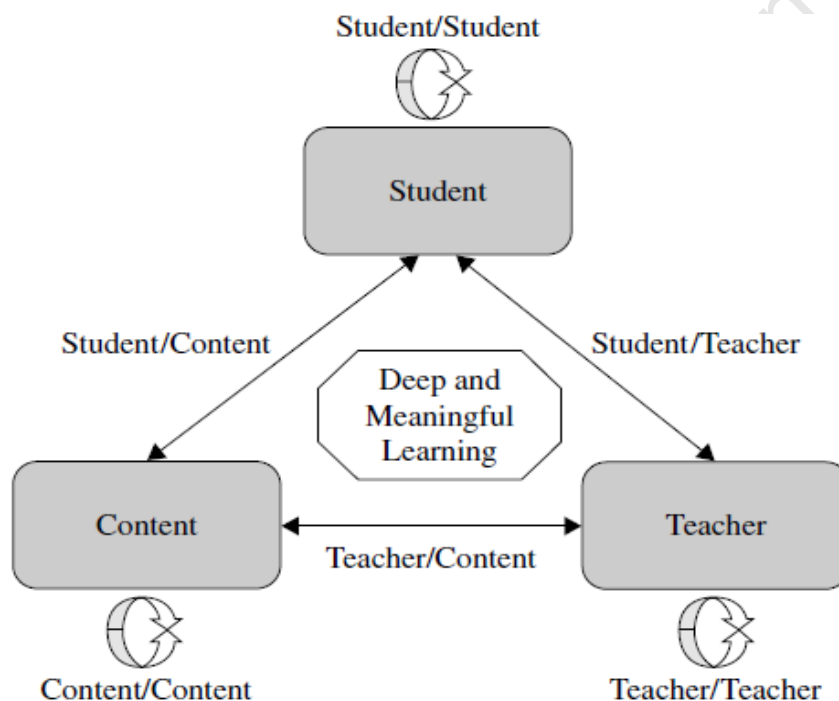


Figure 3.2: The six types of educational interaction

*Source: Anderson (2003)*

**Student-to-Student interaction:** Student interacts with peers. Modern constructivist theorists emphasize the value of peer-to-peer interaction in collaborating and developing multiple clues.



**Student-to-Teacher interaction:** usually the interaction of student with teacher during f2f lecture or in an asynchronous and synchronous online learning that involves communication by text, audio and video.

**Student-to-Content interaction:** an interaction between student and content; this has always involved a major part of formal education, in the form of student studying in the library or reading books in f2f class.

**Teacher-to-Teacher interaction:** creates opportunities for creation and sharing of new ideas for professional growth among communities of like-minded colleagues.

**Teacher-to-Content interaction:** Teacher-Content interaction focuses on the generation of content and learning activities by teachers.

**Content-to-Content interaction:** a new mode of educational interaction in which content is programmed to interact with other content, so as to refresh itself constantly, and so acquire new capabilities.

Anderson (2003) argues that deep and meaningful formal learning is supported as long as one of the three forms of interaction is engaged at a high-level (student-to-teacher; student-to-student; student-to-content). Anderson's six interaction types emphasize the "who" of interaction. In other words, these various models of interaction have focused largely on which objects are interacting than on the mediation of an interface which occurs in any interaction (Woods & Baker, 2004).

### **3.5 MOBLEC: An Interactive Mobile Lecturing Model**

MOBLEC, an interactive mobile lecturing model, is proposed. This mobile lecturing model aims to foster deep learning through students' high-level engagement with lecture vodcasts

on their mobile devices. Anderson's six types of educational interactions are integrated into FRAME to form MOBLEC. The MOBLEC model is shown in Figure 3.3.

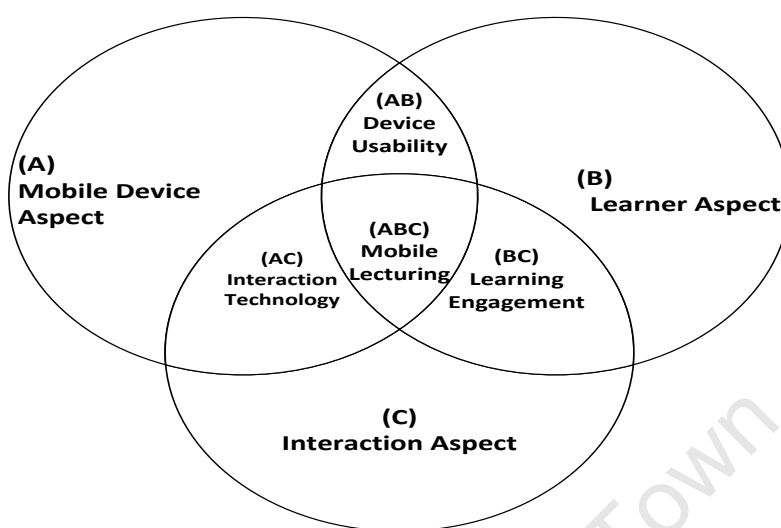


Figure 3.3: MOBLEC Framework

*Adopted from KOOLE (2009) and ANDERSON (2003)*

The reasons for merging FRAME with Anderson's Interactions to form MOBLEC model are: The FRAME model was successfully used to evaluate the potential and suitability of mobile devices as learning tools in distance learning though it did not effectively address the relationship between the mobile technology and the phenomenon of learning to foster deep and meaningful learning. Dyson (2011) argues that mobile technology alone is insufficient to create a deep learning experience. Kenny et al. (2009) also argue that evaluating mobile devices strictly on the basis of their hardware and software characteristics will not effectively address the relationship between technology and the phenomenon of learning. Anderson (2003) provides a way of understanding how deep and meaningful learning happens through interactions. Anderson (2003) argues that deep and meaningful formal learning is supported as long as one of the three forms of interaction is engaged at a high-level (student-to-teacher; student-to-student; student-to-content). In view of these arguments, it seems reasonable to

embrace both mobile technologies and learning interactions to enhance both formal and informal learning. Anderson's interactions did not specify the interface for which interaction occurs. FRAME model provides an interface via mobile devices where learning interactions can occur to foster deep learning. Students engage with lecture vodcasts on their mobile devices anywhere and at any time and on the move using these learning interactions (Anderson, 2003). These interactions encourage learning at individual pace and foster deep learning.

The MOBLEC model is proposed to establish a description of the mobile lecturing process. The researcher's view is that learning is enhanced by engagement. This is reflected in the MOBLEC model. The context for the MOBLEC model is learning. Learning may occur through different types of interactions. Within this context, the MOBLEC model is represented by a Venn diagram in which three aspects intersect (Figure 3.3). The three circles represent the Mobile Device (A), learner (B), and Interaction (C) aspects. Device usability (AB) describes devices' portability, intuitiveness and ability to provide "anytime and anywhere" access to information. Interaction technology (AC) describes the affordances of mobile devices to engage in high-level interactions mediated by an interaction tool. The intersection labelled learning engagement (BC) contains different learning interactions based on Anderson's six educational interactions.

All three aspects overlap at the primary intersection (ABC) which is located in the centre of the Venn diagram. The primary intersection, a combination of all three aspects, represents and defines the mobile lecturing process. In this model, mobile lecturing enables students to engage in high-level interactions with lecture vodcasts on their mobile devices to foster deep learning. For these interactions to occur the educators specify the learning tasks to

prompt students' learning. High-level interactions here involve interactions with Anderson's learning interactions.

The Mobile Device Aspect (A) of the model presents the functional and physical parts of mobile devices, i.e. the path through which learners interact and the impacts on their physical and comfort levels. Physical characteristics refer to the size, weight and storage capacity of the device. The user's physical comfort with a device is a reflection of these characteristics. Physical comfort also refers to how flexible and how easy the user can handle and operate the device. Mobile devices provide the interface between the learner and the learning task.

The Learner Aspect (B) refers to the individual learner's abilities and prior knowledge, social-cultural and historical context of the learner and learners' familiarity with mobile devices.

The Interaction Aspect (C) describes learning interactions in terms of Anderson's six educational interactions for learning. While the three main aspects are clearly important, the interactions between them are those most likely to determine the effectiveness of mobile lecturing. These interactions are represented in the intersections as device usability (AB), interaction technology (AC) and learning engagement (BC).

The Device Usability (AB) contains attributes that are common to both the mobile device (A) and learner (B) aspects. Mobile devices' portability, intuitiveness and ability to provide "anytime and anywhere" access to information help to characterize their affordances. This intersection relates characteristics of mobile devices to learning tasks such as the acquisition of knowledge as well as the manipulation and storage of learning processes.

These processes are affected by how intuitive the device is or how quickly a learner can begin to understand the device.

Interaction technology (AC) mobile device (A) and interaction (C) aspects form the basis of the interaction technology intersection. This intersection refers to the ability of learners to interact with each other; it describes how mobile devices enable interaction and collaboration. Here, the software tools provided by mobile technologies for interaction constitute the interaction technology. These tools allow learners to interact and acquire information and share knowledge. Mobile devices have networking mechanisms for connecting to the interaction tools i.e. Wi-Fi, 3G networks, etc.

Learning Engagement (BC), learner (B) and Interaction (C) aspects forms the basis of the learning engagement intersection. It focuses on the learning interactions (Anderson interactions) that are enabled by the interaction technology. Usually these interactions will be driven by a learning task or a desire to know something or consult with the knowledgeable others, or educators specifying the learning tasks to prompt student learning.

Mobile Lecturing (ABC) is the primary intersection of the MOBLEC model; it integrates the Mobile Device (A), learner (B), and Interaction (C) aspects. Effective mobile lecturing empowers learners to engage at high-level with lecture vodcasts on their mobile devices to foster deep learning. The MOBLEC model consists of three intersections: Device Usability (AB), Interaction Technology (AC) and Learning Engagement (BC) intersections. Each intersection must be present to some degree for mobile lecturing to have occurred (Kenny et al., 2009). The next section describes the development of an interactive mobile lecturing tool based on the MOBLEC model.

### 3.6 Development of an Interactive Mobile Tool for MOBLEC Model

Mobile technologies can be used for learning outside f2f lectures; students engage with lecture vodcasts on their mobile devices to enhance learning. For this study an Interactive Mobile Lecturing Model (MOBLEC) is proposed. The MOBLEC model describes a mode of learning in which learners engage with mobile lectures to enhance their learning. In the MOBLEC Model; the interaction technology (AC) defines a mobile lecturing tool to enhance interaction in the model. Figure 3.4 describes the proposed architecture of this interactive mobile lecturing tool “MOBILect”.

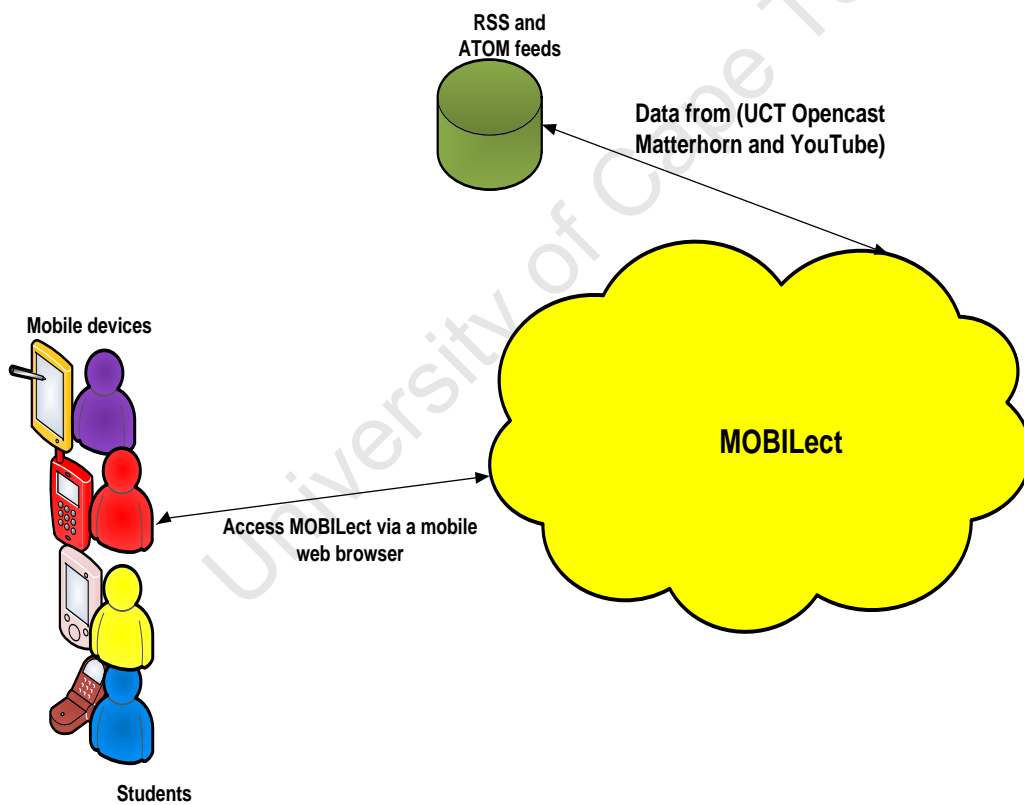


Figure 3.4: Proposed Architecture of MOBILect

MOBILect is a web-based application (hosted on a website) that can be accessed by entering a specific URL in the web browser that is already installed on a mobile device or PC. Web-based application is desirable because it is compatible to most platforms (Wagner, Gruber, & Hartmann, 2008). MOBILect provides the platform to access relevant data on the mobile device. It has a database to store Meta data for the data that was last gathered from the last mobile query (query). It gives a record of updated resources from various access points (comments from other users that use it).

Mobile devices are used by students to access MOBILect via mobile web browsers. These provide interfacing for the students. Mobile devices display and store images of videos and texts accessed from MOBILect.

The advantages of the proposed MOBILect architecture are:

- I. The architecture supports developing light-weight and cross-platform web application(s) for the Web.
- II. The architecture provides multichannel access for both mobile devices and desktop PCs. It is capable of running on all kinds of mobile devices and PCs.
- III. The design is simple; hence, its implementation and feature integration would be easy.
- IV. The design is extensible to support additional features.

The development of “MOBILect” is divided into two phases: Design and Implementation Phases.

### **3.7 Design Phase of MOBILect**

The design Phase for MOBILect will involve design requirements i.e., users, interface design, choice of programming and appropriate technologies etc.

#### **3.7.1 Design Requirements**

Parsons, Ryu and Cranshaw (2006, 2007) propose a framework for mobile learning applications that support mobile learning experiences. This framework identifies the

design requirements of m-learning applications in terms of four perspectives: Generic mobile design issues, Learning contexts, Learning experiences, and Learning objectives. 'Generic mobile design issues' explain these five features: User role and profile, Mobility, Interface design, Media type and Communication support. The next requirement is how 'Learning context' could be supported by the five features described above; this context is identified by six sub-features: Identity, Learner, Activity, Spatio-temporal, Facility and Collaboration. Also relevant is the users' learning experiences and objectives. The four aspects of expected learning experiences are: Organised contents, Outcome and feedback, Goals and objectives, and Social interaction. Using this framework to analyse the design requirements for MOBILect; (see Table 3.2) below.

### **3.7.2 Mock up Design of MOBILect**

Mock-ups are used by designers mainly to acquire feedback from users about designs and design ideas early in the design process (Soegaard, 2004). Mock-ups are very early prototypes made of cardboard or otherwise low-fidelity materials. Mock-up design provides valuable feedback, functionality, usability and understanding of the basic design process. The advantages of mock-ups (and prototypes) are:

Mock-ups make it possible to do usability testing early in the development process. Mock-ups make the design procedure simple and flexible to alter since the design process is not expensive. Mock-ups focus on the functionality of the design and less attention is paid to the actual design.

Balsamiq Mock-up design (Balsamiq, 2011) is adopted for the design of MOBILect. Balsamiq Mock-ups are similar to drawing but because it is digital, it is more flexible. This mock-up is adopted for the interface design of MOBILect because of its flexibility. The initial mock-up design for MOBILect is shown in (Figure 3.5).



Table 3.2 Design of MOBILect

Design Issues	Learning Contexts	Learning experience	Learning Objectives
<p><b>User roles and profile</b> Students of HEIs. Student that cannot cope with f2f lectures due to language difficulties or Large class size.</p> <p>Students that do not have contact at all with f2f lecture.</p> <p>Students that want to interact with other students.</p> <p><b>Mobility</b> Students possess smart phones for mobile web access on the move.</p> <p><b>Mobile Interface design</b> Mock-up Design for MOBILect.</p> <p>PHP, HTML5 For MOBILect Coding.</p> <p><b>Media Types</b> Students access MOBILect in Video format (lecture vodcasts).</p> <p><b>Communication Support</b> Students access MOBILect via Wi-Fi and 3G networks</p>	<p><b>Identity</b> Students of HEIs Teachers of HEIs</p> <p><b>Activity</b> Students attend face- to- face lectures. Students access lecture vodcasts via Mobile devices</p> <p><b>Spatio-temporal</b> Students at same place and same time.</p> <p>Students at different place and different time.</p> <p><b>Facility</b> Students interact with MOBILect via smart phones, Wi-Fi, 3G networks.</p>	<p><b>Organised contents</b> Lecture podcasts and vodcasts.</p> <p><b>Outcome and feedback</b> Students access lecture Podcast or vodcast through MOBILect via mobile devices.</p> <p><b>Goals and objectives</b> Students access MOBILect to enhance their learning and foster deep learning.</p> <p><b>Social interaction</b> Students interact with each other to construct new knowledge.</p>	<p>Improved and deep learning via Mobile Lecturing Tool (MOBILect)</p>

In this mock-up design recorded lectures (videos) are further divided into segments, students' watch each segment of video and post comments as each segment is watched. The comments (content) from each segment are aggregated and viewed by the teacher or other students. The advantages of this design are (Homestead, 2010): The smaller file size of video leads to faster download of the files. The smaller segment file allows scrolling sideways and videos segments are displayed on a page. It allows choice of video segments a user wishes to view, which conserves bandwidth. It uses relevance-enhanced segments for quick navigation.

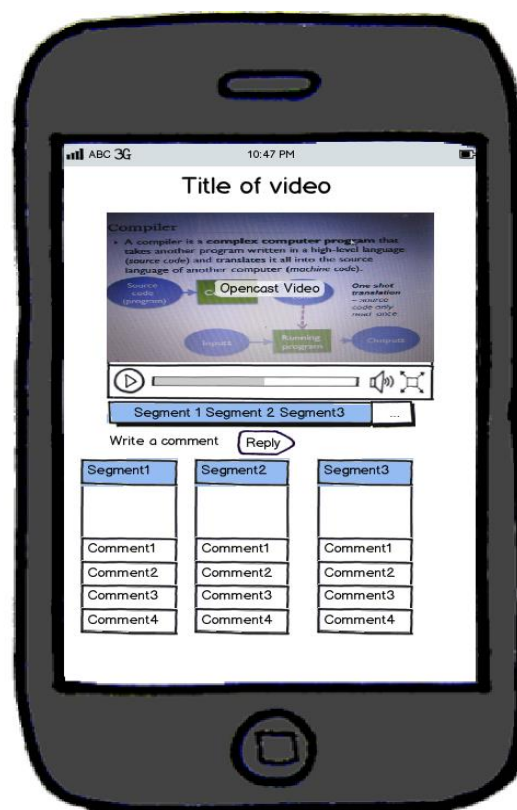


Figure 3.5: The initial Mock up Design

The disadvantage of this design is how to split a video into segments and still maintain the meaningful flow of the lecture (Ally, 2005). With the design of the initial mock up design (see figure 3.5), the researcher had a meeting with six-project team of UCT

Opencast Project during which the mock-up design was presented for comments and feedback. One of the comments was that the design was not suitable for the UCT opencast project; their explanations were that UCT Opencast Matterhorn records lecture vodcast into numerous segments and further dividing the segments into smaller pieces might not be necessary or meaningful. The video files are not large, so that further segmenting each of this file might not be useful and may render the lecture meaningless. It is very important that students understand and find every bit of the lecture relevant to make effective learning possible. These comments influenced the re-design of the system. Ally (2005) also comments that segmentation of course materials should be made into meaningful and complete units.

A modified version of the initial mock-up design was adopted after the meeting with the UCT Opencast Project team (see Figure 3.6). In this design, each video file is not further divided into segments. Students watch the whole recorded lecture and post comments or questions while they are watching the video, so that they do not forget the key points in the lecture. In this design approach, students have two options to view or download the recorded lecture. This mock-up design is more applicable to UCT. After the design of final mock-up design (see figure 3.6), the researcher had discussions with a group of six students and one lecturer at Department of Computer Science, UCT to further validate the usability of the mock-up design for the project. The researcher received positive responses about the functionality and usability of the mock up design from the group.

Figure 3.5 shows the initial mock-up design where each video file is further divided into smaller segments. Students watch each segment of video and post comments. These comments are aggregated from all video segments and made available to the student. This initial mock-up design in Figure 3.5 may be tackled as future work, since there may be other

scenarios different from UCT implementation that might require further segmentation of video. Figure 3.6 depicts the final mock up design for MOBILect where the video files are not segmented. Students watch each video file and post comments. All the comments posted by students are visible to others.



Figure 3.6: Final Mock up design (MOBILect)

### 3.7.3 Choice of Programming Languages and Technologies

MOBILect uses hypertext pre-processor (PHP) as its preferred scripting language. PHP is a high level programming language that is widely used to develop web applications and has a low-learning curve. It has enormous libraries and frameworks for developing web applications and services. PHP5 code was written in an object-oriented way to extract relevant information from the XML files - the UCT Opencast (atom.xml) and YouTube RSS (youtube.xml) using the PHP-XPATh Application Program Interface (API) and storing the

relevant information in a database (W3Schools, 2012a). In this tool, the PHP XPATH binding was used. The binding is required for language transformation (Extensible Style sheet Language Transformation (XSLT)), parsing an XML file and stepping through an XML Document Object Model (DOM).

### **3.7.3.1 Support for HTML**

Most mobile operating systems on the market today, such as Symbian OS, Window mobile, Blackberry OS, iOS, Android, the Apple OS (iOS), Palm Web OS and Linux, are supported by Web applications (HTML) (Maske, Guhr, Kopp & Breitner, 2011). All of these operating systems are implemented using different programming languages and technologies. To develop an application that runs on all the devices regardless of its firmware or operating system, a web-based solution capable of running in all web browsers of the various phones is adopted (Maske et al., 2011). Most popular operating systems are supported by Web HTML solutions. The first priority of the design is conformance to the World Wide Web Consortium (W3C) specifications, most notably regarding the display of video contents on all browsers without specifying a plug-in and using the <div> tag in place of <table> tag in order to make the application readily available for other devices. Both of these are some of the requirements for developing a multi-channel application; an application capable of running on a phone and desktop PC (Oracle, 2010). With the recent embracement of HTML5, it would be professional to develop the application in HTML5 (W3Schools, 2012c) and Cascading Style Sheet CSS 3 (W3Schools, 2012b) in order to make it readily available for most of all mobile devices, most notably the new mobiles that attract students. There is Multimedia W3C API (Video and Audio players) HTML5 support for most mobile browsers i.e. Safari on IOS from version 3.2+, Android browser from version 2.3+ and Blackberry browser from version 7.0+ (Mobilehtml5, 2013).

### **3.8 Implementation of MOBILect**

HTML5 code was written for MOBILect to make the application accessible on most devices mobile and desktop PCs as well as mobile phones. The contents were formatted using Cascading Style Sheet (CSS) 3. In order to add interactivity to the application, some JavaScript code was written and added to the code base. Interactivity includes posting comments without reloading the current display and clearing the search text field so that a user can enter keyword(s) for a search. While the former required the use of AJAX (Asynchronous JavaScript and XML), the latter required the use of SQL (Structured Query Language) in the PHP5 code to write to and fetch information from the database.

#### **3.8.1 Implementing MOBILect with UCT Opencast Matterhorn and YouTube**

MOBILect accesses data from UCT Opencast and YouTube. This is described in this section.

##### **3.8.1.1 UCT Opencast Matterhorn**

Before the implementation of Opencast at UCT, a number of lecturers were employing podcasting and vodcasting solutions. These solutions place extra preparation and post-production costs on the lecturer, one which most busy lecturers would rather avoid. “Opencast is a joint effort of higher education institutions and organizations to develop and distribute audio-visual content in academia” (Opencast, 2012). There are two components for the University of Cape Town (UCT) Opencast implementation: the capture agents and the engage, administration and distribution backend. The capture agents are personal computers (PCs) that sit in the lecture venues and are then combined with other pieces of hardware. To capture the audio, a standalone microphone is installed or the agent is coupled to an existing public address (PA) system. To capture the Video Graphic Adapter (VGA) stream, a frame grabber is inserted into the wiring between the presenter PC (or laptop VGA port) and the venue’s data projector. To capture the video of the presenter a Logitech C910 High Definition webcams is mounted.



Figure 3.7: UCT Opencast Capture Hardware

Figure 3.7 shows a Dell personal computer (OptiPlex 780 USFF), a C910 webcam, a MXL AC404 USB conference microphone, and an Epiphany USB2VGA frame grabber used for Opencast Hardware Capture at UCT. The “backend” at UCT comprises four virtual machines (VM); the first VM runs the admin/engages User Interface (UI), it directs tasks to the other VMs in the backend as well as to the capture agents. Second and third VMs do the encoding of the captured information into different formats required for distribution; the final VM is a streaming server. The capture agents (CAs) are currently running in Ubuntu 10.04, the Matterhorn code is written in Java, built in Apache Maven, runtime is Felix Apache, and Metadata is Dublin Core. (Opencast’s tech stack documentation for Matterhorn is available in (<http://opencast.jira.com/wiki/display/MH/Technology+Stack>)).

Automated recording of the lecture occurs in a lecture venue: a camera captures the lecturers' actions, a microphone captures the audio and finally a VGA "frame grabber" captures any images sent to the data projector. The lecturer clips on the microphone and starts giving the lecture. Behind the scenes a PC records the signals from the camera, microphone and grabber. These signals are stored and at the end of the lecture they are sent via the network to a group of servers that process and send to specific distribution channels (i.e. RSS and ATOM feeds). Atom and RSS feeds are similar technologies which were developed to assist people to receive automatic updates from their subscribed websites (RSS, 2002). MOBILect accesses lecture vodcasts via UCT Opencast ATOM/ RSS feed distribution channel. The capturing of the lecture allows the revision of the lecture afterwards; it allows the learner to listen attentively to f2f lectures knowing that notes can be taken later when listening to the lecture vodcast. Vodcasting is a growing phenomenon at higher education institutions around the world and UCT is not an exception.

### **3.8.1.2 YouTube Implementation**

YouTube is a video-sharing application that allows various files to be uploaded to its numerous servers when online (EDUCAUSE, 2006). YouTube allows users to tag videos, post comments and search for content with a keyword. YouTube is a website designed to allow users from all over the world to post a video created from any source. The user-friendliness of YouTube enables editing mode to various videos according to specific taste. The benefit of using YouTube as compared to other video sites is the content availability. YouTube enables users to view and engage with videos, though most of the content on YouTube lacks an educational goal (Duval, 2010). Lecture vodcasts (educational contents) are uploaded into YouTube by the lecturer. MOBILect accesses lecture vodcasts from YouTube, which have been uploaded with #UCT tag (see figure 3.9). These lecture vodcasts



are interacted with through MOBILect. Figure 3.8 shows how to select the file to be uploaded to YouTube. Figure 3.9 shows the details to include in the file upload for the file to be made available to the MOBILect tool. These details are the title of the video, the description of the video, the #UCT tag for the video, etc.

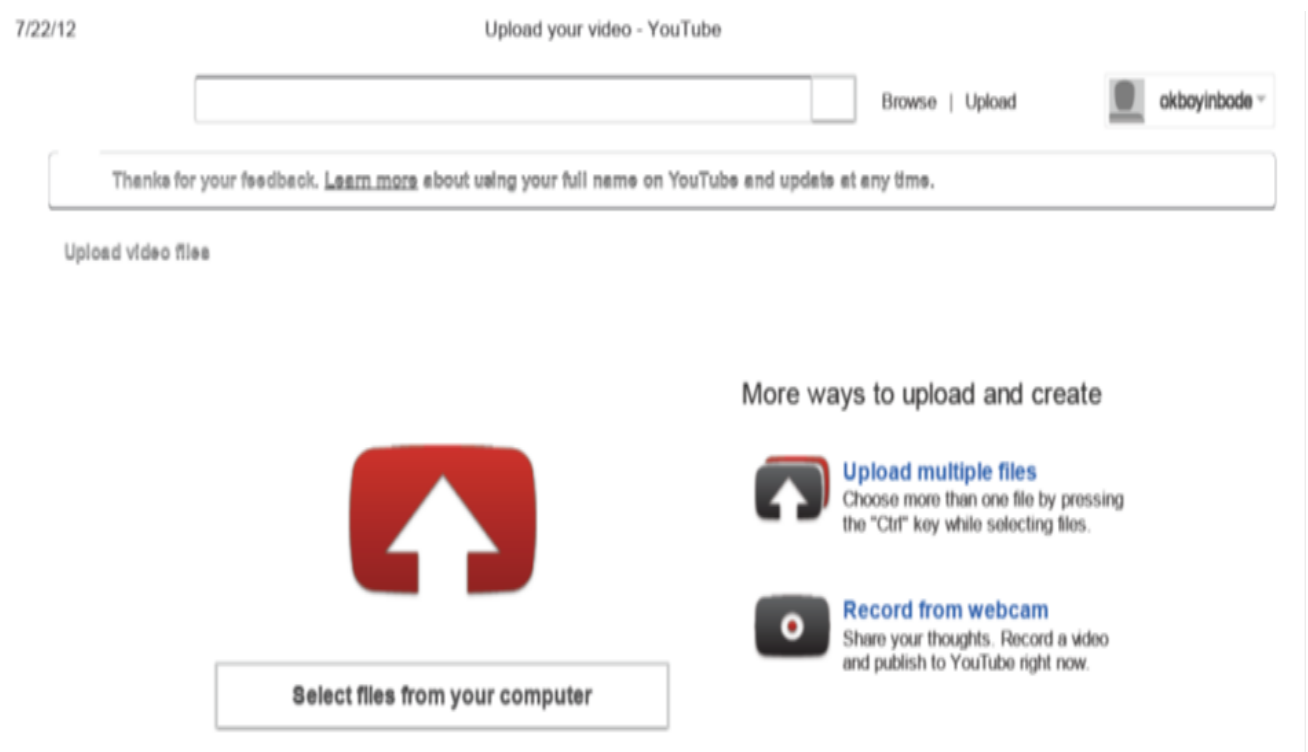


Figure 3.8: File Upload in YouTube

Source: [www.youtube.com](http://www.youtube.com)

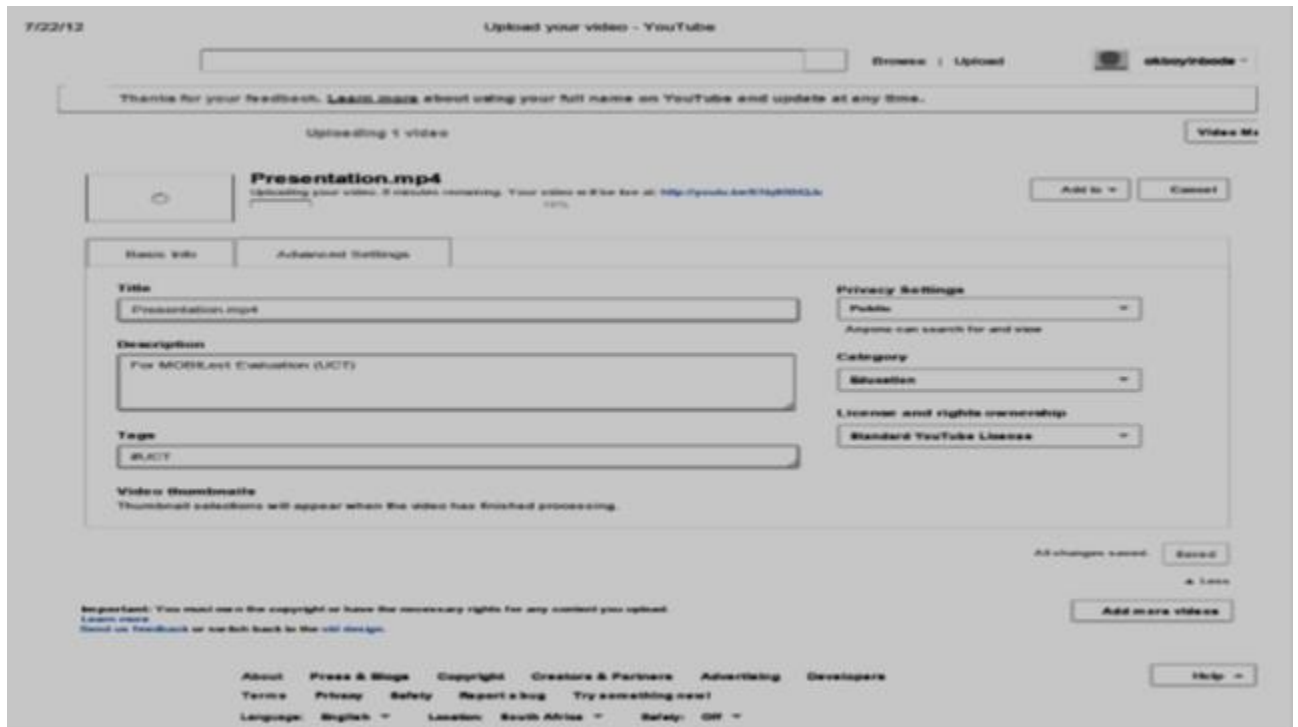


Figure 3.9: Details for File Upload in YouTube

Source: [www.youtube.com](http://www.youtube.com)

### 3.8.2 An Interactive Mobile Lecturing Tool

An Interactive Mobile Lecturing (MOBILEct), a web-based mobile tool draws artefacts (lecture vodcasts i.e. video and text) from the UCT Opencast Matterhorn implementation (called UCT Opencast project at <http://media.uct.ac.za/engage/ui>) and YouTube (provided it has a #UCT tag). It allows commenting on the lecture presentations, downloading of the file, student searches for a presentation from the list displayed. The application runs at <http://ngportal.com/opencast>. YouTube integration makes the tool generic so that lecture vodcasts recorded by other techniques apart from Opencast Matterhorn can be loaded into MOBILEct (see figure 3.9). MOBILEct interface on a mobile device is shown in figure 3.10.



Figure 3.10: MOBILect on a Mobile Device

MOBILect draws artefacts from YouTube at <http://www.youtube.com/rss/tag/uct.rss> (see figure 3.11). Lecture vodcasts are loaded into MOBILect by uploading the lectures to YouTube using #UCT tag; by the lecturer. MOBILect displays 10 entries from UCT Opencast and 25 entries from YouTube (#UCT tag) (see Appendix A). Ideally it would be better to display the latest uploaded 10 videos from both sources, with a next button to upload the next 10 etc.



Figure 3.11: MOBILect YouTube RSS file

The UCT Opencast project is capable of presenting recorded presentations and videos in multiple formats and views. The supported formats are Adobe Flash (FLV/SWF), Microsoft AVI (Audio Video Interlace), MPEG4 (Moving Pictures Expert Group 4) and MP3 (MPEG-1 Audio Layer-3). The formats are in presentation or presenter mode. The presentation mode includes slides display and the presenter's voice. The presenter mode includes the image of the presenter and the presenter's voice. The presentation mode uses the filename "presentation.avi or presentation.mp4" and the presenter mode uses "presenter.avi or presenter.mp4". All the media types (avi, mp3 and mp4) are available in an ATOM file at <http://media.uct.ac.za/feeds/atom/0.3/latest/index.xml> (see figure 3.12).

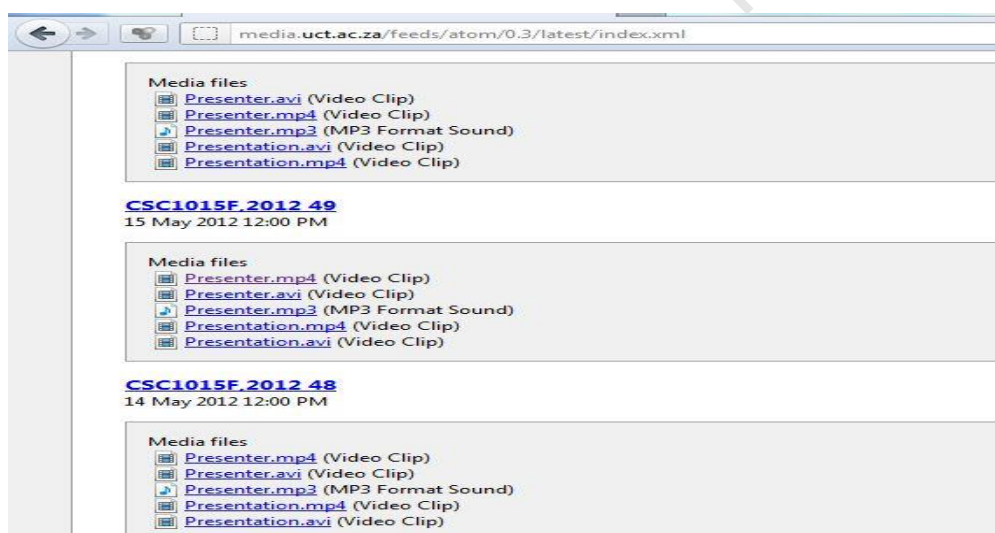


Figure 3.12: MOBILect UCT Opencast ATOM file

### 3.9 Summary

In this chapter the MOBLEC model is proposed. The model attempts to use its intersections device usability, learning engagement and interaction technology to define mobile lecturing. In this model, mobile lecturing enables students to engage in high-level interactions with lecture vodcasts on their mobile devices to foster deep learning. A mobile lecturing tool

“MOBILect” was developed to evaluate the MOBLEC model, The architecture, the mock -up design and implementation of MOBILect were described in this chapter. The next chapter describes methodology adopted for the study.

## **Chapter Four: Methodology**

### **4.1 Introduction**

This chapter presents the research design that was followed in this study. It also describes the research method for the procedure for data collection and analysis. This chapter further gives justification for the procedures that were followed. Details of the methodology are described in the following sequence: Research design, Mode of enquiry, Data collection method and Data analysis.

### **4.2 Research Design**

A research design is a logical sequence which links the empirical data to the original research questions of the study and eventually to its conclusions (Yin, 1994, p. 19). It can also be described as an elaborate plan or a framework leading to the specification of the solution to research problems. When the object being investigated resides as real-life objects, the research problem is regarded as empirical (Mouton, 2001, p. 52). The major focus of the research problem in this study is to explore how a mobile lecturing tool can engage students in high-level learning interactions to foster deep learning. It can be concluded that the research problem in this study is empirical.

Research questions are implicitly or explicitly embodied within the research problem (Mouton, 2001, p. 53). A research question is a question that a research study seeks to answer and it guides the entire research process. Research questions may also be classified as empirical or non-empirical and then sub-divided into different categories (Mouton, 2001, p. 53). As already established, the research problem in this study is empirical and the research question is, therefore, also empirical. The research questions for this study are defined as below:

- I. In what ways does mobile lecturing engage learners to foster deep learning?

- II. How do mobile devices enhance students' learning?
- III. To what extent are learner-centred interactions facilitated through a mobile lecturing tool?

To address these three research questions, the researcher employed a triangulation approach which falls within the qualitative research design. Creswell (2005, p. 39) defines “qualitative research as a type of educational research in which the researcher depends on the views of participants, asks broad and general questions, collects data that consists largely of words or text from participants, describes and analyses these words for themes and conducts the inquiry in a subjective manner”. Qualitative research provides the researcher with a choice on how to structure the research design (De Vos, 1998). The choice of this qualitative research design employs an exploratory and contextual focus and also allows the researcher to conduct an in-depth investigation of the phenomenon to answer the three research questions for this study.

### **4.3 Mode of Enquiry**

One of the modes of enquiry designed for qualitative research is the case study strategy (Creswell, 1998). A case study is defined as a “strategy for doing research which involves an empirical investigation [or a holistic inquiry] of a particular contemporary phenomenon within its real life context [or natural setting] using multiple sources of evidence” (Robson, 2002, p. 178). A holistic inquiry involves the collection of in-depth and detailed data which are content-rich and involve different sources of information. These sources include focus group discussions, direct interview, direct observation, participant, audio-visual material, documents and reports. A case study strategy was employed for this study by the researcher to gain deep understanding of the research context and the process being followed. Other reasons for the case study approach are: It provides elaborate details that helps in

understanding the complexity of human behaviour (Mark, 1996, p. 218), the possible depth of the inquiry through a case study method is higher than for any other research method (Galliers, 1991). A case study also strictly follows the logic of the experiment than a survey (Yin, 1994). This study employs four different case studies (Two case studies at University of Cape Town, South Africa (UCT), Bindura University of Science Education, Zimbabwe (BUSE) and Federal University of Technology, Akure, Nigeria (FUTA)) which are described below:

#### **4.3.1 Case Study One**

##### **4.3.1.1 Case Study Description (University Of Cape Town (UCT), South Africa**

The researcher conducted two case studies (Case Study one and Case study two) at UCT. The participants were undergraduate students of UCT. The University of Cape Town (UCT) is South Africa's oldest university located in Cape Town in the Western Cape province of South Africa and is one of Africa's leading teaching and research institutions. UCT has a student population of close to 23,000 and of these over 4,500 are international students, the majority of whom come from countries in the Southern African Development Community (SADC). The choice of UCT students as case studies stems from the fact that English is the medium of instruction at UCT. An increasing number of students do not speak English as their mother tongue (Spiegel, Khotseng, Gxilishe, Kaschula, Van der Merwe et al., 2003); some of the students come from academically challenged backgrounds (Nzimande, 2009), which makes learning in f2f sessions laborious.

Students of UCT were invited to participate in an evaluation. In UCT f2f lectures are usually conducted for 45 minutes and there is often no adequate times to engage in discussions about the lecture – the f2f lectures are unidirectional. Some of the students do not understand the f2f lectures enough to ask questions or they may be shy to ask questions so as not to make a fool of themselves or there may not be enough time to ask questions. Some



podcasting projects such as Ng'ambi (2008a, 2010) have attempted to address this problem. These projects benefit students in that they can download and listen to podcasts or watch lecture vodcasts after the f2f lecture to revise, re-listen or take down notes, but the engagement is at a low-level because the mode of interaction is still unidirectional. Students can only replay the f2f lecture but the students cannot interact by asking questions or accessing aggregated comments from other students. MOBILect was developed by the researcher to enable students to engage in high-level interactions where students comment on lecture vodcasts using mobile devices, and the aggregated comments become accessible as a learning resource for the students. The MOBILect learning scenario for the UCT students is described as follows: The teacher assigns a task to trigger students' learning with MOBILect for deep learning. Tasks like quizzes or certain aspect of the lecture which may be quite difficult to comprehend can be posted.

- Student posts answers in response to a task.
- Students post questions that were not asked during the f2f lecture due to time constraints.
- Students interact by commenting on each other's comments/questions or help each other find answers to questions.

#### **4.3.1.1.1 Personas**

Some Personas applicable to UCT students and students of HEIs in other developing countries of Africa are described below:

**Scenario 1:** Makopi is a first-year undergraduate student of UCT. He comes from an academically challenged background of South Africa where students do not have access to learning infrastructures in their high schools. English is his third language; attending f2f

lecture becomes a difficult task for him because he is not able to clearly understand the language or accent of teaching, which is English as adopted in most HEIs in South Africa. After attending the f2f lecture, he was able to access MOBILect on his mobile device to replay the lecture. He posted his questions on the application for peers to help him answer the questions. His peers responded to the questions. Students' aggregated comments became a learning resource for him.

**Scenario 2:** Kate is a second-year student at UCT. She is from South Africa and English is her mother tongue, so she had no difficulties in understanding the f2f lecture. The problem she had was that she is an extremely shy person that cannot ask questions during the f2f lecture. She posted her questions on MOBILect through her mobile device for peers to give answers. The peers responded. Students' aggregated comments became a learning resource for her.

**Scenario 3:** Stanley is a first-year undergraduate of UCT, who missed a f2f lecture due to an illness. He watched lecture vodcast on MOBILect with his mobile device. Students' aggregated comments on the vodcast became a learning resource for him.

#### **4.3.1.2 Participant Selection**

Participants were invited to the evaluation to evaluate MOBILect. To qualify to participate in this study, students should be enrolled in the f2f lecture which was recorded and accessible on MOBILect. Participating students would need to have a Wi-Fi-enabled smartphone that they are familiar with to enhance usability. The evaluation took place first semester using course, CSC 1000F. For the purpose of the evaluation the researcher did not use the real course code. The course was chosen for evaluation mainly because the course has been recorded by UCT Opencast Project and the vodcast was available on <http://media.uct.ac.za/engage/ui> with the permission of the course lecturer. The class

population for CSC 1000F was about 372 students. For some of these students, English was not their mother tongue. The allocated teaching time for the f2f lectures of these courses were about 45 minutes, in which, given the large class size, interaction was near impossible. The course title of CSC 1000 F is Introduction to Computer Programming, where F stands for a first semester course. The course title is anonymised. The course is taken by first-year students at UCT.

To invite the students for the evaluation, an announcement was placed on the course site. Twelve students responded, nine of whom participated in the evaluation; the other three did not possess smartphones. This number of students was sufficient for a qualitative evaluation of the tool as it allowed for an in-depth understanding of user experiences. According to (Marshall, 96) samples for qualitative investigations tend to be small and an appropriate sample size for a qualitative study is one that adequately answers the research question. All nine students were enrolled for course CSC1000F. The nine students were made up of two females and seven males. Seven of the students acknowledged that English is not their mother tongue. The students brought their own mobile devices for evaluation purposes to enhance device usability, allowing students to focus on the learning task and not the mobile device (Antoniou & Lepouras, 2005; Kukulska-Hulme, 2007). Researchers (Attewell, 2009; Traxler, 2009; Lindsay 2010) also argue that it is cost-effective that educational institutions take advantage of the mobile devices students own, rather than rely on institutional provision of similar hardware. Each of these participants signed a consent form (Appendix B) and was allocated an identity number for the purpose of the evaluation to keep their identities anonymous.

#### **4.3.1.3 Procedure for Evaluation**

Students were asked to access MOBILect on their mobile devices (Figure 4.1) to watch the lecture vodcast of CSC 1000F on their different mobile devices. During the evaluation the students were kept in the same space but worked independently. This was necessary both for the purpose of observation and also to share a wireless hotspot set up by the researcher. The researcher used the following criteria within MOBLEC model to structure the procedure for the evaluation:

Device Usability (AB): Students were asked to bring their mobile devices for the evaluation. This request was made to help avoid usability problems. Kukulska-Hulme (2007) indicates that when mobile devices belong to users, the user's level of familiarity with the device helps to avoid many potential usability problems and focus on the learning task and not the device. During the evaluation the students focused on achieving the learning tasks and none had any problem with the usability of their devices.

Learning Engagement (BC): Students were instructed on how to interact using the following interactions (Anderson, 2003): student-to-content, student-to-student and student-to-teacher interactions.

Interaction Technology (AC): Students engaged with MOBILect using the three interactions, student-to-content, student-to-student and student-to-teacher. A task was set up by the teacher on the tool to prompt student revision and learning after f2f lectures. The students were kept in the same space for observation and accessed the tool same time. The following tasks were posted and students were asked to watch the vodcast for 15 minutes and answer the questions.

1. What are the key points in this lecture?
2. What questions are being answered by the lecture?

Student-to-teacher interaction: Teacher posted the task on MOBILect to prompt the students to engage with MOBILect.

Student-to-content interaction: Students watched the vodcast on MOBILect for 15 minutes (See Figure 4.1) and then posted comments to answer the two questions indicated above.

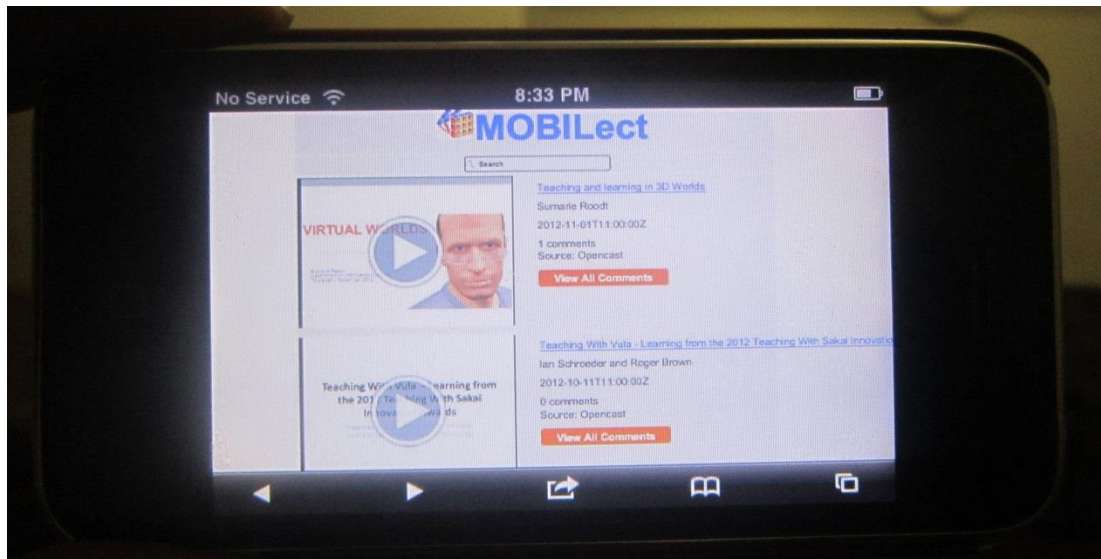


Figure 4.1: MOBILect

Student-to-student interaction: students viewed other students' answers/comments (see Figure 4.2) and then posted another set of answers/comments based on other students' comments.

Student-to-teacher interaction: Teacher viewed the entire comments posted on MOBILect by students to check for any misconception.

In the personas of UCT (see section 4.3.1.1.1) described above the students in question could interact with MOBILect using this same procedure to enhance their learning and overcome their challenges.

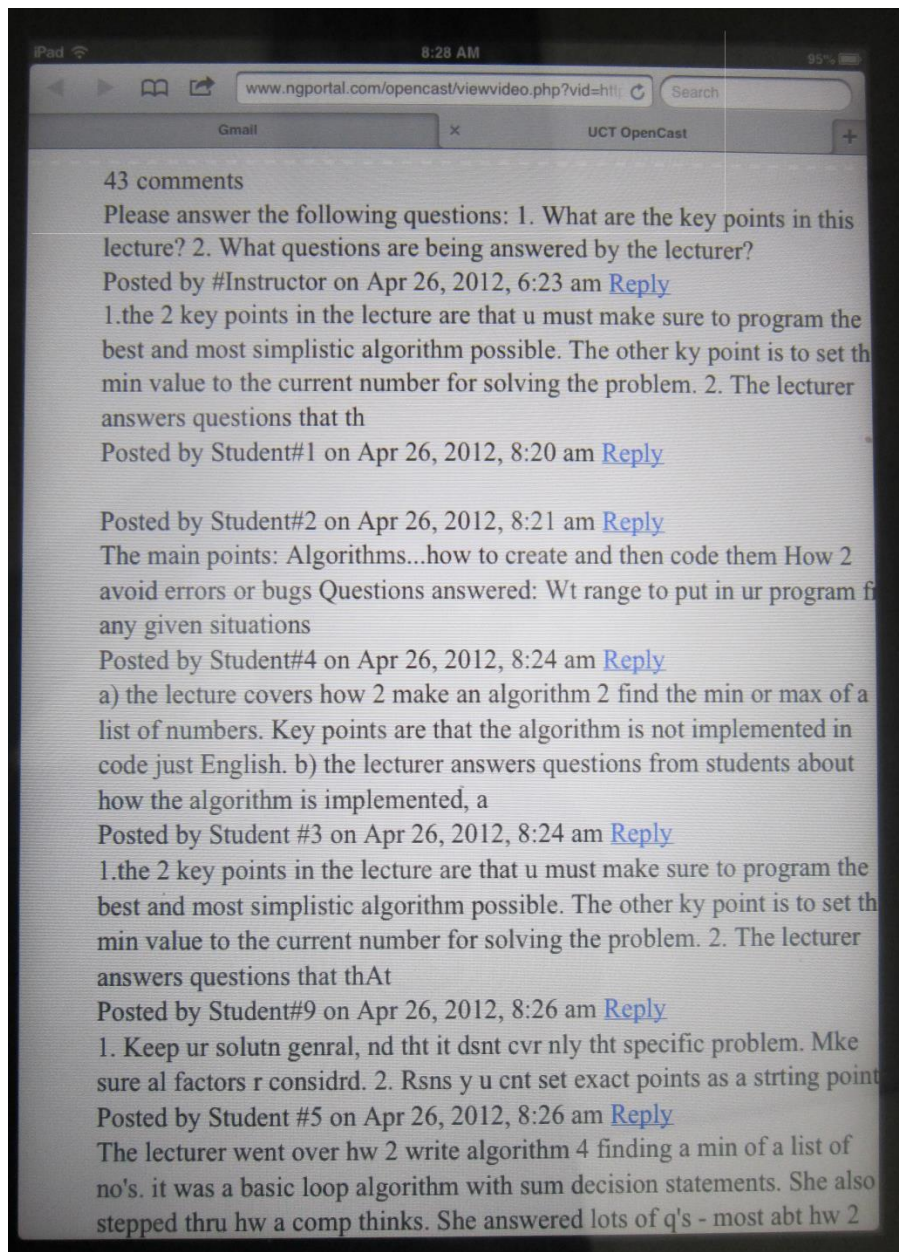


Figure 4.2: Shows some comments posted by students' interactions by iPad

The mobile devices used during the evaluation are classified into three types of operating systems: iOS, Android and Blackberry O/S (see Appendix H). Ketterl, Oldenburger & Vornberger (2012) observe that the most widespread operating systems for today's smartphones are Android, iOS, Windows Mobile and Blackberry OS. Eight different

smartphones used during the evaluation were classified according to their operating systems. Two of the students used the same device (iPad).

#### **4.3.1.4 Ethical Considerations at UCT**

Ethics is defined by Blumberg, Cooper & Schindler (2005, p. 92) as the norm, moral principles, or modes of behaviour that guide choices about the behaviour of the researcher and his/her relationships with others. To ensure that ethical issues are complied with, the researcher informed the participants about the purpose of the research and obtained their consent to use their mobile devices for the evaluation and they were asked to sign a consent form (see Appendix B). The researcher obtained an ethical clearance from UCT before the students participated in the evaluations (see Appendices C & D).

#### **4.3.2 Case Study Two**

Case study two also took place at UCT. The criteria for participant selection were slightly different.

##### **4.3.2.1 Participant Selection**

There was need to explore students that do not have smart phones but are willing to participate in the evaluation. To qualify to participate in this study, students should be enrolled in the f2f lecture. Participating students may not need to have a Wi-Fi-enabled smartphone. The evaluation took place second semester using course, CSC 1010S. For the purpose of the evaluation the researcher did not use the real course code. The class population for CSC 1010S was about 170 students. The course title of CSC 1010S is Introduction to Computer Programming II, where S stands for a second semester course. The course title is anonymised. The course is taken by first-year students of UCT. The course was chosen for evaluation mainly because the course has been recorded by UCT Opencast Project and was available on <http://media.uct.ac.za/engage/ui> with the permission of the course lecturer.

To invite the students for the evaluation; the researcher met with the students in the lecture hall just before the commencement of the f2f lecture with the permission of the course lecturer and invited them for the evaluation. The purpose and benefits of the evaluation were carefully explained to the students, the students were invited to come whether they have smartphone or not. Arrangements were made to borrow smartphones for those that came for the evaluation without any. Ten students responded positively by writing down their names. Eight students eventually turned up for the evaluation exercise. This number of students was sufficient for a qualitative evaluation of the tool as it allowed for an in-depth understanding of user experiences. According to (Marshall, 96) samples for qualitative investigations tend to be small and an appropriate sample size for a qualitative study is one that adequately answers the research question. All students were enrolled for course CSC 1010S. The eight students were made up of (two females and six males). Six students brought their own mobile devices while two students came without a device and were given devices to use for the evaluation. All the eight students were allowed to take part in the evaluation, since only two students turned up without devices. Seven of the students acknowledged that English is not their mother tongue. Each of these students also signed a consent form (Appendix B) and was allocated an identity number for the purpose of the evaluation to keep their identities anonymous.

#### **4.3.2.2 Procedure for Evaluation**

The procedure for Case Study Two was similar to the first one apart from the fact that the questions posted by the teacher were modified because of the course. The questions posted for the second evaluation were:

1. What are the key points in this lecture?
2. What are the features of Object-oriented programming?



Student-to-teacher interaction: Teacher posted the task on MOBILect to prompt the students to engage with MOBILect.

Student-to-content interaction: Students watched the vodcast on MOBILect for 15 minutes and then posted comments to answer the two questions indicated above.

Student-to-student interaction: students viewed other students' answers/comments (see Figure 4.3) and then posted another set of answers/comments based on other students' comments.

Student-to-teacher interaction: Teacher viewed the entire comments posted on MOBILect by students to check for any misconception.

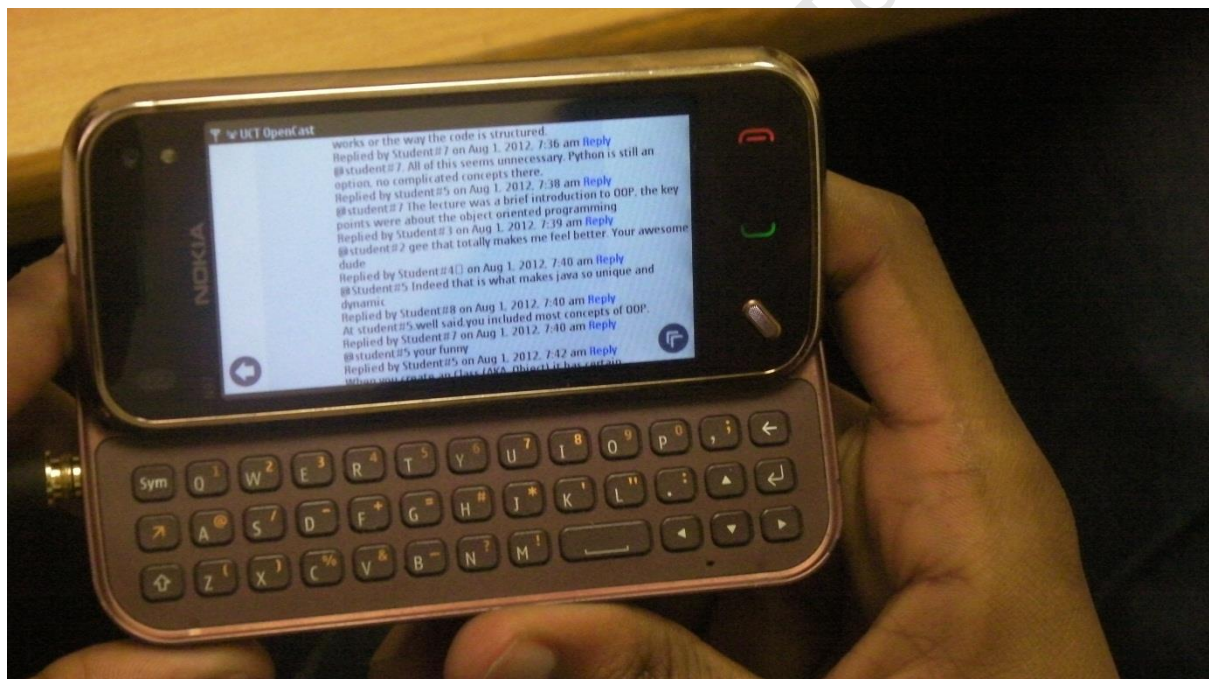


Figure 4.3: Shows some comments posted during Case study two by Nokia N97 Mini

Appendix I shows the six different smartphones used by the students during Case study two classified according to their operating systems. Three of the students used the same device (iPhone 3G).

### **4.3.3 Case Study Three**

#### **4.3.3.1 Case Description of Bindura University of Science Education (BUSE) Zimbabwe**

The third Case Study Three was at Bindura University of Science Education (BUSE), Zimbabwe. BUSE is one of higher education institutions (HEIs) in developing countries of Africa, where the medium of instructions is English language which is not the mother tongue of many of the students. The course evaluated was titled “Introduction to Computer Programming module (CS102)” in the Department of Computer Science. This course was chosen because the course has been recorded by Cam studio by the lecturer and was simply uploaded to MOBILect through YouTube integration by the lecturer. Cam Studio (Cam studio, 2010), an open-source software is used to record the computer screen, while including audio input. Cam Studio is capable of recording all screen activities that happen on the computer. Apart from the language barrier discussed above, the need for MOBILect for part-time students at Bindura University stems from the difference in learning structure between full-time students and part-time students in the institution. Full-time students are always on campus throughout the year to receive instruction from teachers and sit for examinations. The part-time students visit the campus only four times in a year to receive instruction and then sit for examinations with their full-time student counterparts who had been steadily receiving instructions throughout the year. The part-time students are dispersed all over Zimbabwe and are employed, hence are engaged in part-time studies. They visit the campus only four times in a year to receive instruction. The consequence of this limitation is poor academic performance. MOBILect was adopted to assist these part-time students to interact with the lecture vodcast on MOBILect to enhance their learning and performance.

#### **4.3.3.2 Participant Selection**

For the purpose of evaluation at Bindura University of Science Education, Zimbabwe, CS 102 titled Introduction to Computer Programming was evaluated. Part-time students were

invited to use the MOBILect by their lecturer. The total number of part-time students enrolled for the courses were fifteen students. Five students responded and evaluated MOBILect. They were four females and one male. All the students acknowledged that English was not their mother tongue. The students signed a consent form acknowledging their willingness to take part in the exercise (Appendix B). The lecture vodcast was loaded into MOBILect through YouTube integration by the lecturer.

#### **4.3.3.3 Procedure for Evaluation**

The procedure for Case Study Three is different from the first and second case studies. The learning scenario for Case Study One and Case Study Two took place at the same time and same place while Case Study Three learning scenario took place at different time and different place. The following question was posted by Teacher: What is the problem that this lesson is trying to solve?

Five students took part and accessed MOBILect from different places at different time using their personal mobile devices via Wi-Fi and 3G networks. The following Interactions took place:

Student-to-teacher interaction: Teacher posted the task on MOBILect to prompt the students to engage with MOBILect.

Student-to-content interaction: Students watched the vodcast on MOBILect and then posted comments to answer the question above.

Student-to-student interaction: students viewed other students' answers/comments (see Figure 4.4) and then posted another set of answers/comments based on other students' comments.

Student-to-teacher interaction: Teacher viewed the entire comments posted on MOBILect by students to check for any misconception. Teacher posted some interactive comments to the students.

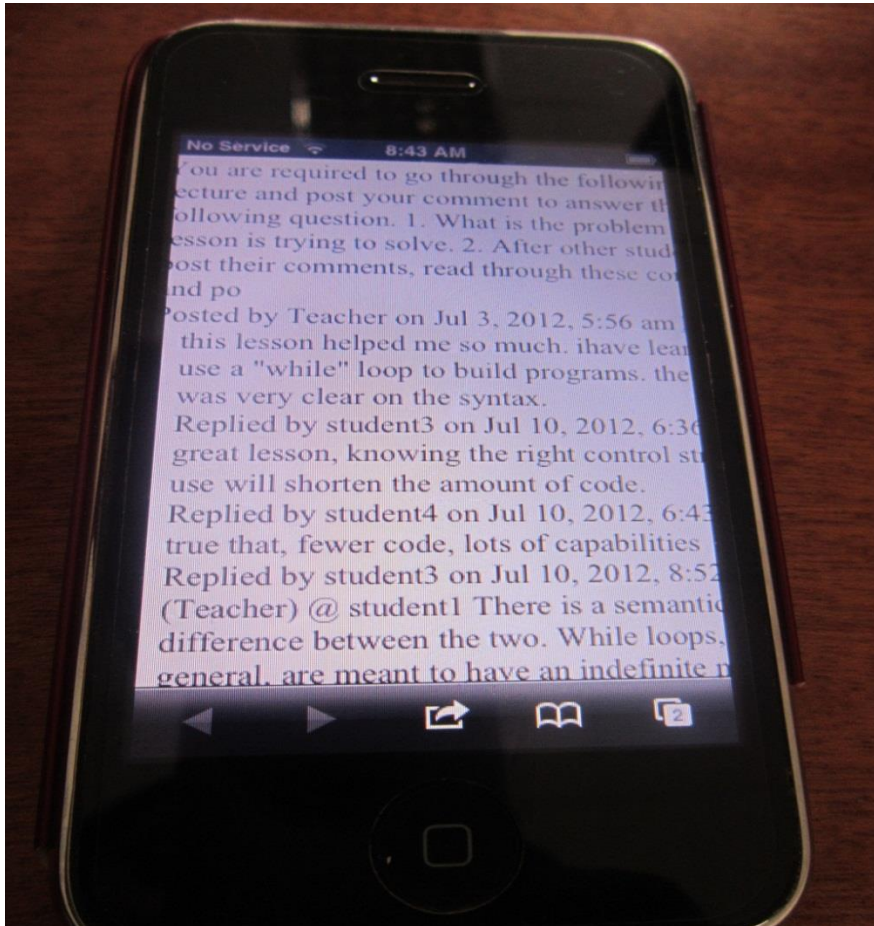


Figure 4.4: Some comments posted during Case study three by iPhone 3G

Appendix J shows the analysis of the five different mobile devices used by the students during Case study three classified according to their operating systems.

#### 4.3.4 Case Study Four

##### 4.3.4.1 Description of Case Study Four, Federal University of Technology, Akure (FUTA), Nigeria

Federal University of Technology, Akure (FUTA), is a top ranking University of technology in Nigeria and indeed the nation's pride. Established in 1981, the university has grown

tremendously, stretching its academic disciplines and research across six different schools and over thirty academic departments. A class of 149 students were invited by their course lecturer to participate in the evaluation. Out of these 149 students, only 100 students possessed smartphones. 70 males and 30 females; 80 students use their own personal devices while 20 students came with borrowed mobile devices (devices they were not familiar with), the other remaining 49 students without devices paired with students who have the device to follow the evaluation.

#### **4.3.4.2 Participant Selection**

The course evaluated was offered by year three students of Department of Computer Science, Mathematics and Statistics, FUTA. Course evaluated is titled "CSC 305 System Programming C". All the participating 100 students acknowledged that English language was not their mother tongue. The class was also a large class where learning interactions between students and teacher are limited. A YouTube Film titled "Structures in C" was uploaded to MOBILect for the purpose of evaluation because FUTA is yet to employ a recording technique for their f2f lectures. The students signed a consent form acknowledging their willingness to take part in the exercise (Appendix B). Students use their matriculation numbers as identities.

#### **4.3.4.3 Procedure for Evaluation**

Students were asked to access MOBILect with their mobile devices for 20 minutes. During the evaluation the students were in the same space and accessed MOBILect independently. All students accessed MOBILect on their devices using the University Wi-Fi. A task was set up by the teacher on the tool to trigger student revision and learning after f2f lectures. The following tasks were posted:

1. Describe three control loops in C programming
2. Differentiate between for and while loop

Student-to-teacher interaction: Teacher posted the task on MOBILect to prompt the students to engage with MOBILect.

Student-to-content interaction: Students watched the vodcast for 20 minutes and then posted comments to answer the two questions indicated above.

Student-to-student interaction: students viewed other students' answers/comments (see Figure 4.5) and then posted another set of answers/comments based on other students' comments.

Student-to-teacher interaction: Teacher viewed the entire comments posted on MOBILect by students to check for any misconception.

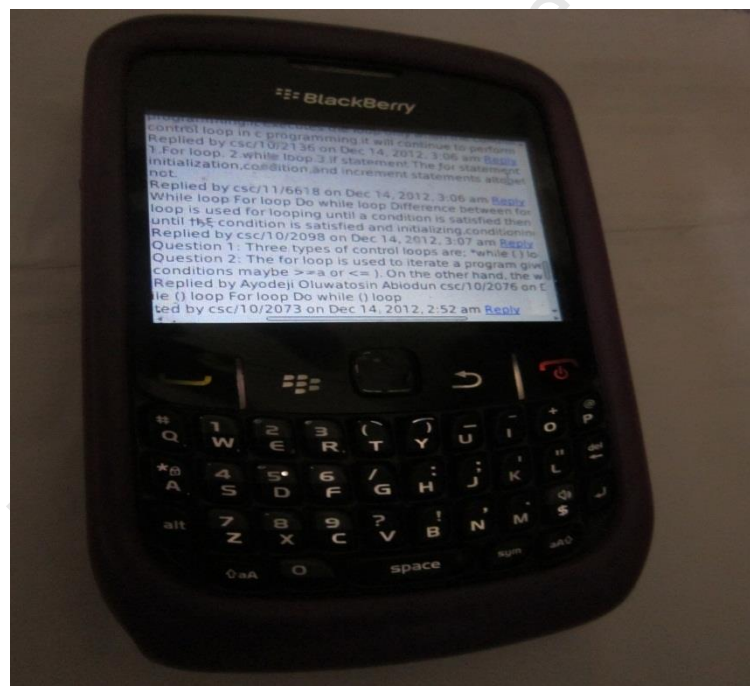


Figure 4.5: Some comments posted during Case study four by Blackberry 9900

The mobile devices used during the evaluation are classified into these operating systems: iOS, Android and Blackberry, Symbian and Opera mini etc. (see Appendix K). 30 different smartphones were used during the evaluation.

#### **4.4 Data collection Methods**

Data collection is important for any type of research design, because inefficient and inaccurate method of data collection can negatively impact the results of a study. Qualitative data was collected in this study from mainly three sources, Focus group discussions, Open-ended questions and Face-to-face interview. Each of the data collection techniques in this study is described in more detail in the following sub-sections:

##### **4.4.1 Focus Group Discussion**

Focus group discussion is a data-gathering method where a set of participants, selected for the purpose of gaining rich information, gathers to discuss issues and concerns (Kreuger, 1988). Focus group discussions have both advantages and disadvantage. The advantages of focus group discussions are that information derived from this method is very rich. It provides a convenient way to collect data from several people at the same time; this encourages participation from people who are not well disposed towards interviewing (Folch-Lyon & Trost, 1981). The major drawback to focus group discussions is that the transcription of the discussions may not be accurate (Maynard-Tucker, 2000). Focus groups are usually composed of small groups of participants. This allows flexibility of access and control of the group by the researcher. This also ensures that all the participants in the group contribute meaningfully on the issue under discussion (Folch-Lyon & Trost, 1981, p. 446). According to Maynard-Tucker (2000, p. 400), focus groups should consist of between four and 12 participants. She affirms that a group of six to eight participants is recommended for best results. The evaluations for Case Study One and two was followed by a focus group discussion. The participants for the focus group discussion for Case Study One were nine and

that of Case Study Two were eight. Each of the focus group discussions were conducted in a quiet laboratory. The researcher moderated the discussions and an audio recording was made of each discussion session. The researcher welcomed the participants and explained the purpose of her study. The participants read and fill the informed consent form (see Appendix B). The researcher coordinated the discussions with a compiled list of nine questions (see Appendix E) and the entire session was audio recorded. Focus group discussions did not hold for Case Study Three because the 5 participants accessed MOBILect from different places and at different time and so were not physically present to take part in a focus group discussion. A focus group discussion did not hold for Case Study Four because students in this study indicated preference to answer open-ended questions than be involved in discussions; most of the students were more confident to write in English than to speak it.

#### **4.4.2 Open-Ended Questions.**

Open-ended questions, an exploratory qualitative method allows the opportunity to give participants the opportunity to respond in their own words, rather than being forced to choose from fixed responses as quantitative methods do. Open-ended questions enact responses that are meaningful, explanatory and rich. Open-ended questions (see Appendix F) were administered for Case Study Two, three and four; 8 participants for Case Study Two, 5 participants for Case Study Three and 100 participants for the Case Study Four. The researcher welcomed the participants and explained the purpose of her study. The participants had earlier read and fill the informed consent form (see Appendix B). Responses were compiled from participants and organized to allow for easy viewing and open coding.

#### **4.4.3 Face-to-face Interviews**

These are interviews involving a meeting between one researcher and one informant (Denscombe, 2007, p. 177). A face-to-face interview was held with the lecturers in charge of the f2f lecture which was accessed on MOBILect by participants for Case study two and Case



Study Four . The interviews were held in the lecturers' office. The interviews were guided by three main questions (see Appendix G). The researcher explained the purpose of the interview to the lecturer prior to commencement of the session and the entire session was audio recorded. The researcher decided to conduct face-to-face interviews with the lecturers because she wanted to gain more insight on their perception on the use of MOBILect to enhance student learning after f2f lecture. The researcher was not opportune to conduct interview for lecturer in Case Study Three due to distance barriers.

## **4.5 Data Analysis**

In this study, the researcher analyzed the focus group discussions, open-ended questions and interview data.

### **4.5.1 Focus Group Discussions Analysis**

Using the MOBLEC model as a mode of reference, questions were developed for the focus group discussion sessions (Appendix E) to answer the three research questions. All the questions were based upon the device usability (AB), learning engagement intersection (BC), and interaction technology intersection (AC) of the MOBLEC model.

Focus group discussions were recorded and transcribed immediately following the discussions. Audio recordings were transcribed. Transcripts were checked for errors to ensure reliability (Creswell, 2009). Audio recordings were listened to multiple times and transcripts were double-checked to ensure accuracy by an expert.

### **4.5.2 Open-Ended Questions Analysis**

Using the MOBLEC model as a mode of reference, five questions were developed for the Open-ended questions (see Appendix F) to answer the three research questions. Question one was based upon the device usability (AB), questions two, three and four were based on

learning engagement intersection (BC), and question five was based on interaction technology intersection (AC) of the MOBLEC model.

Student responses to the open-ended questions were compiled. Data was then open-coded. Open coding involves reading transcripts line-by-line and identifying and coding the concepts found in the data (Strauss & Corbin, 1990). A double-coding strategy was employed to ensure reliability (Miles & Huberman, 1984). In double coding, a set of data are coded, and then after a period of time the researcher returns and codes the same data set and compares the results. A code is a label that describes some general category of data (Gibson & Brown, 2009, p. 131). There are two types of code: Apriori and empirical codes. Apriori codes are defined prior to the examination of data and empirical codes are generated through the examination of the data itself (Gibson & Brown, 2009). Three apriori codes based on the three intersections of MOBLEC model emerged from student responses. This data triangulated with the other data sources in order to answer the three research questions more thoroughly.

#### **4.5.3 Interview Analysis**

Using the MOBLEC model as a mode of reference, questions were developed for the interview (see Appendix G). All the questions were based on interaction technology intersection (AC) of the MOBLEC model.

A face-to-face interview was employed. Appendix G contains the interview questions. The researcher interviewed one lecturer for Case Study Two and four. Interviews were recorded and transcribed immediately following the interview. Transcripts were checked for errors to ensure reliability (Creswell, 2009). Audio recordings were listened to multiple times and transcripts were double-checked to ensure accuracy by an expert.

## 4.6 Summary

Qualitative methods were employed for the study. The methodology, along with the collection process, and the analysis of data were integral in answering the research questions.

Table 4.1 shows the analysis of qualitative procedures employed in the four case studies. Qualitative validity was achieved through triangulation of focus group discussions with open-ended questions.

Table 4.1: A summary of procedures for qualitative methods

	Case Study One	Case Study Two	Case Study Three	Case Study Four
Qualitative Methods	Focus Group Discussion	Focus Group Discussion  Open-Ended Questions  Interview	Open-Ended Questions	Open-Ended Questions  Interview
Ethical Approach	Consent form  Ethical approval from institution	Consent form  Ethical approval from institution	Consent form	Consent form
Data validity & Reliability	Multiple reviews of audio recordings and transcripts	Multiple reviews of audio recordings and transcripts  Open-coding  Double-coding	Open-coding  Double-coding	Open-coding  Double-coding

The three qualitative methods employed in this study adopt questions that were derived based on the criteria within the intersections of the MOBLEC model (device usability, learning engagement and interaction technology) which defines mobile lecturing. Four Case studies

were described. Two studies at the University of Cape Town, South Africa and one at Bindura University of Science Education, Zimbabwe and another one at Federal University of Technology Akure, Nigeria. The next chapter explains the interpretation and analysis of results obtained during the evaluation.

University of Cape Town

## Chapter Five: Results, Findings and Interpretation

### 5.1 Introduction

This study sought to understand ways that mobile lecturing can engage students to foster deep learning. The study started with an evaluation of how students interact with MOBILect (a mobile lecturing tool) on their mobile devices. Qualitative data was obtained through three sources namely; Focus group discussions, Open-ended questions and face-to-face interviews from four case studies. The results for this study will be organised in the following sections: 1) Participants. 2) Analysis of Student Comments (Posted during MOBILect use), 3) Analysis of focus group discussions, 4) Analysis of open-ended responses, 5) Analysis of interview data and 5) Summary of results.

### 5.2 Participants

Participants were invited to evaluate MOBILect. Four case studies were used to collect data to answer the three research questions. Table 5.1 includes context, demographic data, messages and number of devices used for the four studies.

Table 5.1: Analysis of Participants for the Four Case Studies

	CASE STUDY ONE (n=9)	CASE STUDY TWO (n=8)	CASE STUDY THREE (n=5)	CASE STUDY FOUR (n=100)
Country	South Africa	South Africa	Zimbabwe	Nigeria
Higher Education	UCT	UCT	BUSE	FUTA
No of Students who participated in the study	9	8	5	100
No of Males	78% (7)	75% (6)	20% (1)	70% (70)
No of Females	22% (2)	25% (2)	80% (4)	30% (30)
No of students whose English is not their mother	78% (7)	87.5% (7)	100% (5)	100% (100)

tongue				
No of students with borrowed Devices	None	25% (2)	None	20% (20)
No of students Who accessed MOBILect on Mobile devices	100% (9)	100% (8)	100% (5)	86% (86)
No of Comments posted	43	38	11	248
No of different Mobile Devices used	8	6	5	30

Case study one and Case Study Two took place at UCT, the researcher set up a wireless hotspot to ensure that the students did not incur Internet costs because there was restriction to the access of MOBILect on [www.ngportal.com/opencast](http://www.ngportal.com/opencast) through UCT Wi-Fi network due to the firewall which secures the network. As at the time of this writing (February 6, 2013) MOBILect works on [www.ngportal.com/opencast](http://www.ngportal.com/opencast), the firewall restriction from UCT Wi-Fi has been removed. A copy of MOBILect is also available on the UCT server: <http://dfaq.uct.ac.za/opencast> (See Appendix L). In Case Study Three, the five participants used different networks Wi-Fi, 3G etc. to access MOBILect on [www.ngportal.com/opencast](http://www.ngportal.com/opencast), with no network restrictions. In Case Study Four, all the 100 participants also accessed MOBILect on [www.ngportal.com/opencast](http://www.ngportal.com/opencast) via the University (FUTA) Wi-Fi with no restrictions from the network.

In Case Study One, 43 comments were posted, in Case Study Two, 38 comments were posted, in Case Study Three, 11 comments were posted and in Case Study Four, 248 comments were posted. Most of the participants came with their personal mobile devices

though few came with borrowed devices (Case Study Two and Case Study Four). Also it can be seen that majority of the participants did not speak English as their mother tongue (see Table 5.1).

### 5.3 Analysis of Student Comments

This section presents the analysis of the comments posted during the evaluation. Student interactions in terms of student-to-teacher, student-to-content and student-to-student are analysed.

#### 5.3.1 Case Study One (CS1)

(Case Study One: see Appendix M) in the student-to-teacher interaction, the teacher posted questions to prompt interaction and motivate the students to engage. The questions were:

1. What are the key points in this lecture?
2. What questions are being answered by the lecture?

**Student-to-Content Interaction:** This interaction shows the comments posted by students to answer the teacher's questions:

Posted by Student#1: *The key points in the lecture are that you must make sure to program the best and most simplistic algorithm possible; the other key point is to set the min value to the current number for solving the problem.*

Posted by Student#4: *The main points: Algorithms ... how to create and then code them How 2 avoid errors or bugs. Questions answered: Wt range to put in ur program fr any given situations.*

Posted by Student#3: *The lecture covers how to make an algorithm to find the min or max of a list of numbers; key points are that the algorithm is not implemented in code, just English. The lecturer answers questions from students about how the algorithm is implemented.*

Posted by Student#5: *Keep ur solutn genral, nd tht it dsnt cvr nly tht specific problem. Mke sure al factors r considrd. 2. Rsns y u cnt set exact points as a strting point.*

Posted by Student#6: *Find max nd min of list of nos. figure out how 2 solve a problm using a algorithm instead of a program. cn the comp understnd < signs? Yes. Franki askd sumthin... Cudn't hear his q. Cud hear otha q's being answerd bt cudn't hear the actual q's.*

Posted by Student#8: *The lecturer went over 4 finding a min of a hw 2 write algorithm list of no's. It was a basic loop algorithm with sum decision statements. She also stepped thru hw a comp thinks. She answered lots of q's - most abt hw 2 rite the algorithm nd gave sugges.*

Posted by Student#7: *Implementing algorithms, finding a min n max. Asking ideas frm audience. Doing algorithms 1 step at a tym. Hidden errors. Stepping through algorithms.*

Students interacted with lecture vodcast by posting their comments i.e. Student#4 indicating that the main point in the lecture is about algorithms, how to code them and avoid errors or bugs, hence showing his high-level interaction with the lecture vodcast.

**Student-to-Student Interaction:** In this interaction students read the comments of others and replied based on other student's comments:

Reply@student#3 *Yes she did make it clear that the algorithm could be in English i.e. pseudo code.* (Posted by Student#4).

Reply@student#5: *I agree with what you have to say. She used specific decision statements. That being for while loops.* (Posted by Student#9, Student#9 replies Student#5).

Reply@student#5: *I agree with you that the solution should be general, and that an algorithm should be generalities solve any list of numbers.* (Posted by Student#3; Student#3 replies Student#5).

Reply@student#8: *She also gave rsns why certain algrthms wld nt wrk nd hw thy cld be made mre efficient.* (Posted by Student#5; Student#5 replies Student#8).

These interactions show how students interacted with other students' comments by posting answers to reply; it can be seen that Student#3 and Student#9 replied to comments posted by Student#5. See Table 5.2 below for explanation of some of the interactions.

Table 5.2: Explanation of interactions from Case Study One

Mobile Lecturing	Interactions	Explanation
Student-to-Teacher Interaction	CS1 Teacher: 1. <i>What are the key points in this lecture?</i> 2. <i>What questions are being answered by the lecture?</i>	Teacher interacted with student by posting a learning task to prompt students to interact.
Student-to-Content Interaction	CS1 Student#1: <i>The 2 key points in the lecture are that u must make sure to program the best and most simplistic algorithm possible; the other key point is to set the min value to the current number for solving the problem.</i> CS1 Student#4: <i>The main</i>	Students interacted with lecture vodcast prompted by the questions posted by teacher. In this interaction. Student#1 and Student#4 interacted with lecture vodcast by answering the question "What are the key points in this lecture"?



<p>Student-to-Student Interaction</p>	<p><i>points: Algorithms...how to create and then code them How 2 avoid errors or bugs Questions answered: Wt range to put in ur program fr any given situations.</i></p> <p>CS1 Student#3: <i>The lecture covers how 2 make an algorithm 2 find the min or max of a list of numbers; Key points are that the algorithm is not implemented in code just English. The lecturer answers questions from students about how the algorithm is implemented.</i></p> <p>CS1 Student#6: <i>Find max nd min of list of nos. figure out how 2 solve a problm using a algorithm inst ed of a progrm. cn the comp understnd &lt; signs? Yes. Franki askd sumthin... Cudn't hear his q. Cud hear otha q's being answerd bt cudn't hear the actual q's...</i></p> <p>CS1 Student#8: <i>The lecturer went over hw 2 write algorithm 4 finding a min of a list of no's. it was a basic loop algorithm with sum decision statements. She also stepped thru hw a comp thinks. She answered lots of q's - most abt hw 2 rite the algorithm nd gave sugges.</i></p> <p>Reply @student#3 <i>Yes she did make it clear that the algorithm could be in english ie pseudo code. Posted by Student#4.</i></p> <p>Reply@student#5: <i>I agree with what you have to say. She used specific decision</i></p>	<p>Here the students use SMS lingo (SMS abbreviation) to interact.</p> <p>Students interacted with lecture vodcast prompted by the second question posted by teacher.</p> <p>In this interaction. Student#3, Student#6 and Student#8 interacted with lecture vodcast by answering the question "What questions are being answered by the lecture?"</p> <p>Here the students use SMS lingo (SMS abbreviation) to interact with lecture vodcast. Students interact here to create their own meaning of the lecture.</p> <p>Student#4 replies Student#3.</p> <p>Student#9 replies Student#5.</p>
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	<p><i>statements. That being for while loops. Posted by Student#9.</i></p> <p><i>Reply@student#5: I agree with you that the solution should be general, and that an algorithm should be generalities solve any list of numbers. Posted by Student#3.</i></p> <p><i>Reply@student#8: She also gave rsns why certain algrthms wld nt wrk nd hw thy cld be made mre efficient. Posted by Student#5.</i></p>	<p>Student#3 replies Student#5.</p> <p>Student#5 replies Student#8.</p> <p>Here students engaged in high-level interactions by responding to other students' questions or comments. This interaction exposes students to ideas and concepts of other students, hence fostering deep learning.</p>
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From the interactions (Appendix M) that occur in the above case study, 43 comments were posted. Of these 14 comments were posted as student watched the lecture vodcast, which suggests student-to-content interactions. 29 comments were posted in response to postings made by other students (student-to-student interactions). Based on Anderson (2003) that deep and meaningful learning is supported as long as one of the three forms of interaction (student-to-teacher; student-to-student; student-to-content) is engaged at a high-level. Students engaged with each other more as evidenced in the “replies” to peers’ postings at a high-level with 29 comments, hence deep and meaningful learning has been achieved.

### 5.3.2 Case Study Two (CS2)

In the second evaluation (Case Study Two: see Appendix N), the student-to-teacher interaction: teacher posted questions to trigger and motivate the students' learning. The

questions were 1. What are the key points in this lecture? 2. What are the features of object-oriented programming?

**Student-to-Content Interaction:** This interaction shows the comments posted by students to answer the questions:

Posted by Student#1: *The key point in this lecture was the definition of OOP.*

Posted by Student#1: *The key features of OOP are that it involves encapsulation and polymorphism along with many others.*

Posted by Student#2: *The lecturer went over the key points of object-oriented programming, namely the major component OOP is based on, what an object consists of and main states an object can be in.*

Posted by Student#5: *The key points of the lecture is understanding how object-oriented Programming works, how classes are created/defined, how objects work and how they interact with methods.*

Posted by Student#6: *The key point of this lecture was discussing object-oriented design, how to use it.*

Posted by Student# 2: *The key features of OOP are: OOP provides a new paradigm; the main concepts of OOP are: Classes and objects, encapsulation methods and messages, inheritance polymorphism, multiple instances of an object can be created. Objects have two section.*

Posted by Student#7: *What are the key points in this lecture? To learn how objects work and how the (whole) classes are structured.*

Posted by Student#6: *Some features of object-orientated programming include having methods, inheritance and some programs can be polymorphic.*

Students interacted with lecture vodcast by posting their comments i.e. Student#1 stated that the main point in the lecture is the definition of "OOP". Student #5 commented that the key points of the lecture are to understand how Object-Oriented Programming works, how classes are created or defined, how objects work and how they interact with methods. These showed students' high-level interactions with the lecture vodcast.

**Student-to-Student Interaction:** In this interaction students read the comments of others and reply based on other students' comments:

Posted by Student#4: *Classes, methods and objects were emphasized on throughout the lecture if I am correct! Pretty complexish stuff when heard at first.*

Posted by Student#1: *Can you explain the concept of polymorphism? I didn't really understand.*

Posted by Student# 6: *I am having difficulty understanding encapsulation could you help me by providing a short explanation, or an example?*

Posted by Student#2: *the Classes, methods, encapsulation stuff can be really complex stuff but it becomes easy over time especially if someone creates an analogy and dumbs it down from the complex words, you will get used to it.* Replied Student#4.

Posted by Student#7: *I agree but you could have said more like how it works or the way the code is structured.* Replied Student#2.

Posted by Student#2: *When you create a Class (AKA Object) it has certain characteristics and it does certain actions (AKA Methods). Both of these characteristics together are "encapsulated" into a Class. Hence the term encapsulation.* Replied Student#6.

Posted by Student#3: *Polymorphism is when methods can have the same names but can be changed in different classes.* Replied Student#1.

Posted by Student#1: *Encapsulation means hiding your values or methods so that they cannot be accessed or modified from the calling module.* Replied Student#6.

Students interacted with each other i.e. Student#1 asked a question “Can you explain the concept of polymorphism, I didn't really understand?” Student #3 replied by answering that “Polymorphism is when methods can have the same names but can be changed in different classes” Student#6 asked another question “ I am having difficulty understanding encapsulation could you help me by providing a short explanation, or an example?” Student#1 replied that “Encapsulation means hiding your values or methods so that they cannot be accessed or modified from the calling module”. These showed how students engaged in high-level interactions with each other. See Table 5.3 below for explanation of some of the interactions.

Table 5.3: Explanation of interactions from Case Study Two

Mobile Lecturing	Interactions	Explanation
Student-to-Teacher Interaction	<i>Questions 1. What are the key points in this lecture? 2. What are the features of Object-oriented programming?</i>	Teacher posted questions to prompt and motivate students to learn.
Student-to-Content Interaction	<p><i>CS2 Student#1: The key points point in this lecture was the definition of OOP.</i></p> <p><i>CS2 Student#1: The key features of OOP are that it involves encapsulation and polymorphism along with many others.</i></p> <p><i>CS2 Student#2: The lecturer went over the key points of object oriented programming, namely the major component OOP is based on, what an object consists of and main states an object can be in.</i></p> <p><i>CS2 Student#5: The key points of the lecture is understanding how object oriented Programming works, how classes are created/defined, how objects work and how they interact with methods.</i></p> <p><i>CS2 Student#6: The key point of this lecture was discussing object oriented design, how to use it.</i></p> <p><i>CS2 Student# 2: The key features of OOP are: OOP provides a new paradigm The</i></p>	<p>Students interacted with the lecture vodcast to answer the questions posted by teacher.</p> <p>In this interaction, Students #1, #2, #5, #6 and #7 interacted with lecture vodcast to generate their own meaning of the lecture (learner-centred). These high-level interactions foster deep learning.</p>

<p>Student-to-Student Interaction</p>	<p><i>main concepts of OOP are: Classes and objects Encapsulation Methods and messages Inheritance Polymorphism Multiple instances of an object can be created. Objects have two sections.</i></p> <p><i>CS2 Student#7: What are the key points in this lecture? To learn how objects work and how the whole classes are structured.</i></p> <p><i>CS2 Student#6: Some features of object orientated programming include having methods, inheritance and some programs can be polymorphic.</i></p> <p><i>Posted by Student#4: Classes, methods and objects were emphasized on throughout the lecture if I am correct! Pretty complexish stuff when heard at first.</i></p> <p><i>Posted by Student#1: Can you explain the concept of polymorphism? I didn't really understand?</i></p> <p><i>Posted by Student# 6: I am having difficulty understanding encapsulation could you help me by providing a short explanation, or an example?</i></p> <p><i>Posted by Student#2: the Classes, methods, encapsulation stuff can be</i></p>	<p>In this interaction, students #1 and #6 posted questions for other students to answer.</p>
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	<p><i>really complex stuff but it becomes easy over time especially if someone creates an analogy and dumbs it down from the complex words, You will get used to it. Replied Student#4.</i></p> <p><i>Posted by Student#7: I agree but you could have said more like how it works or the way the code is structured. Replied Student#2.</i></p> <p><i>Posted by Student#2: When you create a Class (AKA. Object) it has certain characteristics and it does certain actions (AKA Methods). Both of these characteristics together are "encapsulated" into a Class. Hence the term encapsulation. Replied Student#6.</i></p> <p><i>Posted by Student#3: Polymorphism is when methods can have the same names but can be changed in different classes. Replied Student#1.</i></p> <p><i>Posted by Student#1: Encapsulation means hiding your values or methods so that they cannot be accessed or modified from the calling module. Replied Student#6.</i></p>	<p>Student#2 replied Student4.</p> <p>Student#7 replied Student#2.</p> <p>Student#2 replied Student#6.</p> <p>Student#3 replied Student#1.</p> <p>Student#1 replied Student#6.</p> <p>Here students engaged in high-level interactions by responding to other students' questions or comments. This interaction exposes students to ideas</p>
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		and concepts of other students hence fostering deep learning.
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From the interactions (Appendix N) that occur in the above case study, 38 comments were posted. Of these 21 comments were posted as student watched the lecture vodcast, which suggests student-to-content interactions. 17 comments were posted in response to postings made by other students (student-to-student interactions). Based on Anderson (2003) that deep and meaningful learning is supported as long as one of the three forms of interaction (student-to-teacher; student-to-student; student-to-content) is engaged at a high-level. Students engaged with lecture vodcast at a high-level as evidenced in the 21 “comments” posted. Students also engaged at a high-level with each other as evidenced in the 17 “replies” to peers’ postings. Hence deep and meaningful learning has been achieved.

### 5.3.3 Case Study Three (CS3)

In Case study three (see Appendix O), in student-to-teacher interaction, the teacher posted question to prompt and motivate the students:

What is the problem that this lesson is trying to solve?
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**Student-to-Content Interaction:** This interaction shows the comments posted by students to answer the questions:

*Posted by student#3: This lesson helped me so much; I have learnt hw to use a "while" loop to build programs. The teacher was very clear on the syntax.*

*Posted by student#4: Great lesson, knowing the right control structure to use will shorten the amount of code*

*Posted by Student#3: True that, fewer codes, lots of capabilities*

*Posted by Student #2: The lesson makes it clear how a while loop is used comparing it with the if statement.*

*Posted by Student#5: I have not been posting comments on the platform but I have constantly viewed other people's comments and this has helped me much.*



Students interacted with lecture vodcast by posting their comments i.e. Student#3 indicated that the lesson has helped her so much. She stated “I have learnt how to use a “while’ loop to build programs.” Student#4 indicated that it was a great lesson and knowing the right control structure will shorten the amount of code to be written. These showed students’ high-level interactions with the lecture vodcast.

**Student-to-Student Interaction:** In this interaction students read the comments of others and reply based on other students’ comments:

Posted by student#1: *So which one is the best loop to use between the two or under what circumstances can I use the while loop?*

Reply@student#1: *Something like one is for count controlled and the other when you don't know the number of iterations.* (Posted by student4; Student4 replies student1)

Posted by student#1: *Thank you so much for the lesson, I really understood the concept of the while loop.*

Students interacted with each other i.e. Student#1 asked a question “So which one is the best loop to use between the two or under what circumstances can I use the while loop? Student#4 replied “something like one is for count controlled and the other when you don't know the number of iterations.” These interactions showed how students engaged in high-level interactions with each other.

**Student-to-Teacher interaction:** In this interaction teacher responded to student comments.

Reply@student#1: *There is a semantic difference between the two. While loops, in general, are meant to have an indefinite number of iterations and for loops should have a more definite number of iterations.* (Posted by teacher).

Posted by Teacher: *Hi all, your feedback shows that some have been able to grasp the concepts. From the example given, try to write a program that prints the numbers in reverse order.*

Posted by Teacher: *I can see that this platform enhances learning and helps others who do not always contribute on face-to-face to also contribute, the comments helped other students focus more on t*

*he most important concepts.*

Teacher interacted with students' comments i.e. Student#1 asked a question "So which one is the best loop to use between the two or under what circumstances can I use the while loop? Teacher replied "There is a semantic difference between the two. While loops, in general, are meant to have an indefinite number of iterations and for loops should have a more definite number of iterations". This showed student-to-teacher interactions. See Table 5.4 below for explanation of the interactions.

Table 5.4: Explanation of interactions from Case Study Three

Mobile Lecturing	Interactions	Explanation
Student-to-Teacher Interaction	<i>CS3 Teacher: 1. The question is what is the problem that this lesson is trying to solve?</i>	Teacher interacted with student by posting a question to motivate students to interact in learning
Student-to-Content Interaction	<i>CS3 student#3: This lesson helped me so much; I have learnt hw to use a "while" loop to build programs. The teacher was very clear on the syntax.</i>  <i>CS3 student#4: Great lesson, knowing the right control structure to use will shorten the amount of code.</i>  <i>CS3 Student#3: true that, fewer codes, lots of capabilities.</i>  <i>CS3 Student #2: The lesson makes it clear how a while loop is used comparing it with the if statement.</i>  <i>CS3 Student#5: I have not been posting comments on</i>	<p>Students interacted with the lecture vodcast prompted by the question posted by teacher.</p> <p>In this interaction. Student#3 Student#4, Student #5 and Student#2 interacted with lecture vodcast.</p>

<p>Student-to-Student Interaction</p>	<p><i>the platform but I have constantly viewed other people's comments and this has helped me much.</i></p> <p><i>Posted by student#1: So which one is the best loop to use between the two or under what circumstances can I use the while loop?</i></p> <p><i>Reply@student#1: something like one is for count controlled and the other when you don't know the number of iterations. Posted by student4.</i></p> <p><i>Posted by student#1: Thank you so much for the lesson, I really understood the concept of the while loop.</i></p> <p><i>Reply@student#1: There is a semantic difference between the two. While loops, in general, are meant to have an indefinite number of iterations and for loops should have a more definite number of iterations. Posted by Teacher</i></p> <p><i>Posted by Teacher: Hi all, your feedback shows that some have been able to grasp the concepts. From the example given, try to write a</i></p>	<p>Student #1 asks a question.</p> <p>Student#4 replies student#1.</p> <p>Student#1 responds.</p> <p>Teacher responded to students comments.</p> <p>Teacher replies Student#1 question.</p> <p>Teacher comments on the answers posted by the students.</p>
<p>Student-to-Teacher Interaction</p>		

	<p><i>program that prints that numbers in reverse order.</i></p> <p>Posted by Teacher: <i>I can see that this platform enhances learning and helps others who do not always contribute on face to face to also contribute, the comments helped other students focus more on the most important concepts.</i></p>	
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From the interactions (Appendix O) that occur in the above case study, 11 comments were posted. Of these 5 comments were posted as student watched the lecture vodcast, which suggests student-to-content interactions. 3 comments were posted in response to postings made by other students (student-to-student interactions). 3 comments were posted by teacher in response to postings made by students (student-to-teacher interactions). Based on Anderson (2003) that deep and meaningful learning is supported as long as one of the three forms of interaction (student-to-teacher; student-to-student; student-to-content) is engaged at a high-level. Students engaged with lecture vodcast at a high-level as evidenced in the 5 “comments” posted. Students engaged at a high-level with each other as evidenced in the 3 “replies” to peers’ postings. Teacher also engaged at a high-level with students as evidenced in the 3 “replies” to student postings. Hence deep and meaningful learning has been achieved.

#### **5.3.4 Case Study Four (CS4)**

In Case Study Four (see Appendix P); in student-to-teacher interaction, the teacher posted questions to prompt and motivate the students. The questions were

1. Describe three control loops in C programming 2. Differentiate between for and while loop

Teachers' questions guided students' listening and watching the lecture vodcast and this allowed students to engage in active listening: The students responded by posting comments to answer the questions.

### **Student-to-Content Interaction:**

This interaction shows some comments posted by students to answer the questions:

*While loop, do while loop, for loop. For loop uses different structures in it like initialization, condition and statement, while while loop uses only conditions and then statements. Posted by MTS/10/2485*

*While () loop for loop Do while () loop 2. Do while () loop execute at least once while the while () loop would not execute if the conditions are not met. Posted by CSC/11/6640*

*While-loop is a control loop in c programming.it will continue to perform the task or stop performing. Posted by CSC/10/2136*

*Types of control loop structures includes; while ()loop, for loop and do while()loop. The difference between the while () and for loop is that the for loop you must use the - initialization;conditional statment;increment/decrement. Posted by CSC/10/2029*

*For loop and while loop 2. The differences between for loop and while loop are: 1.for loop initialize variables while loop doesn't 2. For loop does increment and decrement of a single statement while loop doesn't. Posted by MTS/10/2534*

Students interacted with lecture vodcast by posting their comments i.e. Student MTS/10/2485 answered the questions posted by the teacher; that the three control loops in C are " while loop, do while loop and for loop", and the difference between for loop and while loop are" For loop uses different structures in it like initialization, condition and statement, while loop uses only conditions and then statements". This showed student high-level interaction with the lecture vodcast.

**Student-to-Student Interaction:** In this interaction students read the comments of others and reply based on other students' comments:

*Reply @ MTS/10/2489, the comment is good. Posted by MTS/10/2506*

*Reply@ CSC/10/2029 your answers are correct. Posted by STA/10/2501*

*Reply@ CSC/10/2095 you didn't really state your differences in full. My own view is that for loop is mainly for initialization, conditioning, incrementation and decrementation all of which can be contained in for loop declaration whereas the while loop can only .Posted by CSC/10/2098*

*Reply @ MTS/10/2485. Correct answer. Posted by CSC/10/2154*

Students interacted with each other's comments i.e. Student CSC/10/2154 replied Student MTS/10/2485 "correct answer". Student CSC/10/2098 replied Student CSC/10/2095 "you didn't really state your differences in full. My own view is that "for loop" is mainly for initialization, conditioning, incrementation and decrementation all of which can be contained in for loop declaration." These showed how students engaged in high-level interactions with each other. See Table 5.5 for the explanation of some comments posted during CS4 interactions.

Table 5.5: Explanation of some interactions from Case Study Four

Mobile Lecturing	Interactions	Explanation
Student-to-Teacher Interaction	Question 1. Describe three control loops in C programming. Question 2. Differentiate between for and while loop.	Teacher posted questions to prompt and motivate students to learn.
Student-to-Content Interaction	CS4 MTS/10/2485: While loop, do while loop, for loop. For loop uses different structures in it like initialization, condition and statement, while loop uses only conditions and then statements.  CS4 CSC/11/6640: While () loop For loop Do while () loop 2. Do while () loop execute at least once while the while () loop would not execute if the conditions are not met.  CS4: CSC/10/2095: While loop is used	Students interacted with the lecture vodcast prompted by the questions posted by teacher.         In this interaction, Students MTS/10/2485,

Student-to-Student Interaction	for looping until a condition is satisfied.	CSC/11/6640, CSC/10/2095 and CSC/10/2029 interacted with lecture vodcast to generate their own meaning of the lecture.	
	CS4 CSC/10/2029: Types of control loop structures includes; while () loop, for loop and do while () loop. The difference between the while () and for loop is that the for loop you must use the-initialization; conditional statement; increment/decrement.		
	Reply @CSC/10/2029: your answers are correct. Posted by STA/10/2501.	STA/10/2501 CSC/10/2029.	replies
	Reply @MTS/10/2485: Correct answer Posted by CSC/10/2154.	CSC/10/2154 MTS/10/2485.	replies
	Reply @ MTS/10/2489: the comment is good Posted by MTS/10/2506.	MTS/10/2506 MTS/10/2489.	replies
	Reply @ CSC/10/2095: You didn't really state the differences in full. My own view is that for loop is mainly for, initialization, conditioning, incrementation and decrementation all of which can be contained in for loop declaration. Posted by CSC/10/2098.	CSC/10/2098 CSC/10/2095.	replies

From the interactions (Appendix P) that occur in the above case study, 248 comments were posted. Of these 151 comments were posted as student watched the lecture vodcast, which suggests student-to-content interactions. 97 comments were posted in response to postings made by other students (student-to-student interactions). Based on Anderson (2003) that deep and meaningful learning is supported as long as one of the three forms of interaction (student-to-teacher; student-to-student; student-to-content) is engaged at a high-level. Students engaged with lecture vodcast more as evidenced in the 151 “comments” posted, hence deep and meaningful learning has been achieved.

### 5.3.5 Observation

It was observed that during the evaluation in Case Study One (CS1) that student posted their comments using SMS Lingo (Alejandro, 2011). SMS lingo are SMS list of text message short hands. Examples of comments made by student using SMS lingo (see table 5.2):

Posted by Student#6: *Find max nd min of list of nos. figure out how 2 solve a problm using a algorithm inst ed of a progrm. cn the comp understnd < signs? Yes. Franki askd sumthin... Cudn't hear his q. Cud hear otha q's being answerd bt cudn't hear the actual q's.*

This sort of interaction allowed students to post comments in a *language* that is understood by most of the students since they are used to sending SMS through their phones. These SMS ‘lingo’ provided a shorthand form that allowed students to rapidly post their comments and interact with other students since the students are conversant with the *language*. It allowed for flexibility and made students to be relaxed when using the tool. The SMS lingo allow students who have problems with the language of teaching, for whom English is not their mother tongue, to communicate with peers with SMS lingo with which they are familiar.

## 5.4 Analysis of Focus Group Discussions

Using the MOBLEC model as a mode of reference, questions were developed for the focus group discussion sessions (see Appendix E) to answer the three research questions. All the questions were based upon the device usability (AB), learning engagement intersection (BC),



and interaction technology intersection (AC) of the MOBLEC model. This section contains the analysis of the focus group discussions for Case Study One and Case Study Two.

### **Device Usability (AB):**

Students commented on the ease of using their mobile devices for accessing MOBILect. All the participants were currently enrolled in the corresponding f2f lecture. The students participated using their personal mobile devices. One student reported that *“yes, first round you can see what it was meant to do as I looked at it”*. MOBILect has a simple and friendly interface that the students found it easy to access on their devices. Another student commented that *“For new users, you can just say this is what you are supposed to do, and then once they have it should be easy from there on and I think at first glance I could probably see what I have to do. I don’t really need a lot of help going around from page to page. I can actually see what it does ....”* This indicates the simplicity of the tool. Another student indicated that the name “MOBILect” was most suitable for the tool and allows a student at first glance to know what the tool is all about.

Though some of the students had limitations in accessing MOBILect on their mobile devices due to small screen; students responses indicated that with smaller devices like (iPhones, iPod touch etc.), it was a bit difficult to watch the video and to move around the screen to read comments because of the small screen, but this was not actually a limitation because the students were already familiar with their devices and were able to navigate successfully through MOBILect. Kukulska-Hulme (2007) indicates that when mobile devices belong to users, the user’s level of familiarity with the device helps to avoid many potential usability problems. One student reported that with an iPad device that accessing MOBILect on his device was very exciting and that the screen made the comments bold and easy to read. The students reported certain limitations to their devices:

*“Using an iPod Touch I find it difficult to look at people’s replies and it’s kind of hard to scroll down and look at things and somebody complained that you kind of lose the format that you wrote and you can’t see how many comments and it’s kind of not ordered like all the replies to my statement down so that I can keep track of them.”*

*“I have a Nokia N97 ....I constantly had to refresh, so I had to refresh to see the latest comment”.*

*“Using a small phone (iPhone 3G) you have to zoom in and zoom out, it’s a bit difficult to maintain a chat.”* Though the students faced these limitations but their familiarity with their devices assisted and enhanced the usability.

#### **Learning Interaction (BC):**

Students were asked to interact with MOBILect using student-to-content interactions and student-to-student interactions. Teacher interacted with the students by assigning a task to trigger students’ learning (student-to-teacher Interaction). Commenting on the task posted by the teacher, students interacted with the lecture vodcast on MOBILect via their mobile devices. Their responses on the benefits of the student-to-content interactions are:

*“Given that we have already heard the lecture, it would be good for revision and reinforcement of what we have heard; it’s kind of like a revision thing.”*

*“It allows students who are shy to ask questions freely”.*

*“I just think the whole thing is nice to see the video after the lecture because then people talk about it, people understand the video more clearly, then you can read what they say and then it gives you lots of opinions about what happened in the lecture and it helps.”.*

*“I think it’s nice if I didn’t get the lecture, if I wasn’t able to ask the lecturer questions or I didn’t understand. It depends if I am sick and not able to attend f2f lecture then it will be beneficial.....”*

The use of the tool gave the students more insight into what was taught in the f2f lecture. The students indicated the benefits of the interaction as being good for revision, and to listen to the lecture vodcast on MOBILect if absent from the f2f lecture (See Section 4.3.1.1.1) for the 3<sup>rd</sup> personas where Stanley missed a f2f lecture due to an illness. From the above discussions, the student-to-content interactions in (CS2, CS3, and CS4) engaged the students in high-level interactions according to Anderson (2003) to foster deep learning. This kind of interactions will also be beneficial to Makopi who has difficulties in understanding f2f lectures due to language barriers (See section 4.3.1.1.1) for the 1st personas.

Student engagement with MOBILect was anonymous; students did not use their real names but were given a specific student number for evaluation. Because of this anonymity the students felt confident to post questions and comments. Students further interacted with the comments of other students posted on MOBILect. One of the students commented that the anonymity would give a lot of students the confidence to actually ask questions and others would benefit from it. Other responses are:

*“The fact that it is anonymous gives a lot of people confidence to actually ask the questions and then they themselves and others benefit from it.”*

*“They can probably ask questions that students are shy to ask, because when you ask a question digitally then you’re not as scared of putting yourself out there; asking a dumb question or a question you may think is dumb, then they could help students who don’t really want to ask questions in class”. He further commented, “You would be less shy, for example,*

*because in a lecture you might be afraid to ask stupid questions, though it might be a valid question but you are afraid that if you ask this question, other people might just be thinking that this is a really dumb question, because that was exactly what was happening in the first semester course".* A student gave a real life experience he said *"At the beginning of the semester, people who were never on this programme asked questions and the people who were familiar with the programme were like saying 'Aahhhhh', and these people stopped asking questions because of that."* The students confirmed that there were questions that they would never ask in f2f lectures but would ask when using the tool. The students responses indicated that shy students that could not ask questions during the f2f lecture will find the tool useful (See Section 4.3.1.1.1) for the 2nd personas where Kate a shy person could not ask questions during the f2f lecture.

Students interacted with other students by viewing other students' comments and also posting their comments. One student commented that seeing other student comments was a good way to evaluate yourself whether you really understand the concept or not. He stated

*"I would say it is a good way to evaluate yourself whether you understand the concept or not, because if someone explains something better, you can gauge yourself on where you are ..."*

Another student commented that *"The difference between the lecturer's train of thought and the students train of thought can be different so you find yourself relating to how another student has interpreted the information that they source and in that case you can learn a bit better"*.

One of the students further explained that student-to-student interaction can really help to understand the course concept much more by getting answers to questions from different students. She stated that *"if you have a question then you can just ask it, generally someone will know the answer so it will benefit you in the sense that it does not necessarily*

*have to be the lecturer replying to you". She further said that "if you post a question, someone in the 300 or so who have actually attended the lecture will know the answer so it will benefit you, and the good thing is that if someone replies with one answer, then someone replies with a different answer; eventually there will be an answer that is consistent. So you will have a broad idea, which gives room for discussion". Other student responses on the benefits of student-to student interactions are:*

*"Useful."*

*"Valuable information"*

*"Many people know lots and you discover it through them seeing the comments."*

*"Many people know much more than we think they do, it is really helpful if your peers know things you don't."*

From the above discussions, the student-to-student interactions in (CS1) engaged the students in high-level interactions according to Anderson (2003) to foster deep learning. The students indicated that the comments of other students assisted to post meaningful comments. It exposed students to other people's ideas on the lecture. Students also benefited from the accrued knowledge of others, i.e. from the aggregated comments (the comments posted by other students), students reported that the different opinions and ideas of others had allowed them to gain deeper understanding of the lecture. This kind of interactions will be beneficial to Makopi who has difficulties in understanding f2f lectures due to language barriers (See section 4.3.1.1.1) for the 1<sup>st</sup> personas.

Students responded to the benefits of the student-to-teacher interactions: In student-to-teacher interaction, the teacher interacted with the students by posting learning tasks on the MOBILect to trigger student interaction with the tool. The students posted comments to

answer the learning tasks. The students indicated that interaction with the teacher through the tool would be an eye-opener for the teacher: The teacher would be able to discern the understanding level of the class, whether the class really understood the concept of the course or not. One student commented that *“It would be an eye opener for her, to know whether what she’s teaching in class is getting through or not”*. The teacher would be able to know the level of the class, whether f2f teaching was making sense to the students or not. She would know the questions some of the students were struggling with but could not ask in the f2f class. One student commented that *“She will be able to know the level of the class, maybe know the ‘dumb questions’ students were afraid to ask, know some of the questions students are struggling with”*. One student further commented *“The lecturer will be able to focus her presentations to be more effective in the way that the students are receiving”*. The students believed that interaction with the teacher via the tool will be quite useful and different from the f2f lectures in that they are not limited to the time and space of classroom.

### **Interaction Technology (AC):**

The students indicated the positive functionality of the tool (MOBILect). The students affirmed that the tool fulfilled its purpose. They responded to the benefits and functionalities of the tool. They indicated that the tool had ability to enhance and improve their understanding of the f2f lecture. One of the students acknowledged the usefulness of the tool as a good tool for preparing for a test or for quick revision; He stated that students’ aggregated comments were *“a good tool for preparing for a test, basically people will give you key points of the lecture, so you don’t have to scan through the whole course”*.

The tool was designed to be simple and easy to use. During the mock-up design, teachers and students of UCT examined the design of the tool and declared it as simple to use. The students indicated that the tool was easy to access and use and that for a newcomer to the tool

it is easy to know what the tool is all about. They further indicated that the name of the tool “MOBILect” (Mobile lectures) is most appropriate. One of the students observed that at first glance of the tool “ *I could probably see what I have to do, I don’t really need a lot of help going around, from page to page, I can actually see what it does*”.

The students indicated various ways that the tool could be improved; they commented that though navigating the tool with their devices was easy, the tool could be made more user-friendly. They suggested that there should be clearer boundaries between comments and replies, automatic updates of comments should be made possible and an offline version of the tool should be developed. The comments of the students below indicate some of the suggested improvement to the tool:

*One student suggested vibration of the phone when a new comment is posted on the tool: “And maybe its number on this phone and maybe is someone replies, it kind of vibrates, it’s going to be cool.”*

*“Another thing I can actually add to that is you have a web-based version but you can also have non-web based version, for example dedicated platform versions. Like an actual application that would run on Android, IOS or Blackberry.”*

Though student indicated that a non-web version of MOBILect should be made available, Web-based applications are desirable because they can be accessed on most operating system platforms. Non-web based applications require modifications to port to different platforms (Wagner et al, 2008). Web-based MOBILect has been accessed from different platforms such as Symbian, Blackberry, iOS, Android, Opera mini etc.

*“Also I think with what you are aiming at, as you said, the workplace or being on the move , with the audio, it’s much easier to listen to something and do something else, than to sit there and stare at the screen, when you on the move it is easier to listen.”*

The students suggested that the tool should have different versions i.e. audio version which students can listen to while walking and also to limit the bandwidth usage. Most vodcasts have the ability of retaining students’ attention for longer period of time than does podcasts, (Daly-Jones et al., 98) though podcasts may be preferable in situations where student is walking or driving and watching when Vodcast might pose a risk.

*Student suggested having a “like” button similar to the one on Facebook where students can vote the best comment and it will move to the top.*

*“I think you should also create a Like button, like on Facebook”.*

*“Also with this like thing, where you can vote for the best comment, so then the best comment goes to the top, so then if someone says something very helpful it can go to the top”*

The students gave the following recommendations, cautions and hints for the potential users of the tool. The students’ responses are as follows:

*“I recommend the students be proactive about it and even if they do comment or give an answer, they must be able to give a comprehensive answer and things like that, it would simplify things for people who are reading it, that’s exactly what I am talking about.”*

*“Still go to lectures and then later on you can watch this and use it more as a recap, because sometimes in a lecture you get distracted and you miss a section then you don’t want to say ‘please repeat that’ because lecturers sometimes don’t like repeating things ...”*

*“Use it as an extra, a supplement, not to replace f2f.”*



*“Don’t replace your lectures with this”*

*“I think students must be able to refer other students to other useful references, to say you can look up this in this book chapter...”*

In summary, students encouraged their peers not to replace f2f lectures with the tool but engage with the tool as a supplement to f2f lectures.

## **5.5 Analysis of Open-Ended Responses**

Participants were asked to answer five open-ended questions. For CS2 eight participants answered the questions, for CS3 five participants answered the questions. For CS4 one hundred participants answered the questions. After the data was compiled and organised into a Microsoft word document, open coding was performed. All responses were double-coded by the researcher to ensure reliability. Three apriori codes that emerged were derived from MOBLEC model; Device Usability, Learning Engagement and Interaction Technology. The table below presents the definition of each code.

Table 5.6: Open-Ended Codes

Code	Definition
Device Usability	Respondent comments positively on the ease of use of his/ her mobile device.
Learning Engagement	Respondent comments on how easy it was to interact with others and gain more insight into the f2f lecture.
Interaction Technology	Respondent comments on how easy it was to interact with the interaction tool (MOBILect)

The following table (Table 5.7) provides some examples of the responses from participants based on the three codes in CS2 on the open-ended questions.

Table 5.7: CS2 Open-Ended Coding Examples

Code	Example
Device Usability	<p><i>“ I was able to access the lecture and add comments on my mobile device without any difficulties”</i></p> <p><i>“N97 was suitable for the tool”</i></p> <p><i>“ Comments are easy for me to read on my device”</i></p> <p><i>“ a few clicks and you are viewing the lecture”</i></p> <p>Participants commented positively on the ease of use of his/ her mobile device.</p>
Learning Engagement	<p><i>“Interacting with others students is cool. I am able to understand the concept of f2f lecture more”</i></p> <p><i>“ It makes me to be confident about asking questions”</i></p> <p><i>“ The interaction is always available even in absence or illness”</i></p> <p><i>“ Informative and good for reference”</i></p> <p><i>“ It could supplement and reinforce the learning experiences”</i></p> <p><i>“It was good and engaging”</i></p> <p><i>“ a good substitute for lectures if I am unable to go”</i></p> <p><i>“ one learns how to approach problems from a different perspective”</i></p> <p>Participants commented on how easy it was to interact with others and gain more insight into the f2f lecture.</p>
Interaction Technology	<p><i>“ I am impressed with this tool, it is indeed simple, valuable and educative”</i></p>

	<p><i>“Navigation through the tool is very comprehensive”</i></p> <p>Participants commented on how easy it was to interact with the interaction tool (MOBILect).</p>
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The first code “Device Usability” has all the responses indicating ease of access of the tool with their mobile devices. This may indicate that there was no hitch with accessing the tool with their mobile devices. The second code “Learning Engagement” has to do with the benefits of interacting with other students and teachers. All responses reported benefits. This may indicate the usefulness of the tool in engaging students in high-level interactions. The 3rd code “Interaction Technology” has to do with the simplicity and functionality of the tool. All the responses indicated the tool as being beneficial. Table 5.8 provides some examples of responses from participants in CS3 on the open-ended questions

Table 5.8: CS3 Open-Ended Coding Examples

Code	Example
Device Usability	<p><i>“It was suitable. The video was very clear and the internet access is super”</i></p> <p><i>“I think it is a better and more efficient way of studying and learning. Since most of us students are used to mobile browsing, chat and online interaction”</i></p> <p>Participants commented positively on the ease of use of his/ her mobile device.</p>
Learning Engagement	<p><i>“I have learnt and understood the deference of a “while loop” and a “for loop” and I can now confidently pick the correct control structure to solve a problem”</i></p> <p><i>“It was great and educative. Interaction with peers were sincere with no timidity”</i></p>

	Participants commented on how easy it was to interact with others and gain more insight into the f2f lecture.
Interaction Technology	<p><i>“MOBILect was very easy in that instead of me going through some text I had to just see the code in action. It was very useful in the sense that I didn’t have to make a trip to the library or the lecture room but had to view it from the comfort of my bed, making it cost effective. It was intuitive in that I could replay the video over and over, plus the addition of interactivity in the comments part with other students regardless of geographical location”</i></p> <p>Participants commented on how easy it was to interact with the interaction tool (MOBILect).</p>

The first code “device usability” has four responses out of five indicating ease of access of the tool on their mobile devices. This may indicate that the tool was easy and simple to access on their mobile devices. The fifth response indicated a hindrance due to network speed and not because of the device. She reported that the 3G connection offered by her service provider was a bit slow, so streaming took a bit of time, but once the video clip was streamed it was ok.

The second code “Learning Engagement” has to do with the benefits of interacting with other students and teacher. All the responses reported benefits of the interaction. This may indicate the usefulness of the tool in engaging students in high-level interactions.

The 3rd code “Interaction Technology” has to do with the simplicity and functionality of the tool. All responses agreed to the usefulness of the tool. This may indicate the tool as being very beneficial and suitable for students especially in different geographical locations

(distance learning). Table 5.9 provides examples of responses from participants in CS4 on the open-ended questions.

Table 5.9: CS4 Open-Ended Coding Examples

Code	Example(s)
Device Usability	<p><i>“ my mobile web browser was able to open and navigate the pages”</i></p> <p><i>“my mobile device was suitable for accessing the tool”</i></p> <p>Participants commented positively on the ease of use of his/ her mobile device.</p>
Learning Engagement	<p><i>“I have gained a lot from my peers. This is really helpful”</i></p> <p><i>“The answers the other posted help to gain more information about the questions posted”</i></p> <p><i>“ Hum, learning from other students through this tool is impressive because not everyone of us can have the opportunity of talking to each other after class, but this tool helps a lot by replying and commenting on our post”</i></p> <p><i>“my understanding of the question asked is improved through answers supplied by other students”</i></p> <p><i>“Wide range of answers to particular question will widen the scope of the student about the course”</i></p> <p>Participants commented on how easy it was to interact with others and gain more insight into the f2f lecture.</p>
Interaction Technology	<p><i>“This tool is really cool; it is really what every student of computer science wants. It increases my familiarity with the web and helps me to think well and fast”</i></p> <p><i>“ It gives me confidence to answer questions which am unable to answer in class because of fear”</i></p> <p><i>“ I can express myself well without feeling shy because I am a shy type and always scared to ask questions in a group or crowd”</i></p>

	<p><i>“ This interaction is innovative and educative”</i></p> <p><i>“ It exposes us to the use of mobile devices in receiving lectures and replaying it”</i></p> <p><i>“The tool provides me with opportunity to engage my time studying rather than surfing through the web doing something that is not meaningful”</i></p> <p>Participants commented on how easy it was to interact with the interaction tool (MOBILect).</p>
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The first code “Device Usability” has eighty-six responses out of one hundred responses indicating good usability of the devices. This may indicate that majority of the mobile devices were suitable for the interaction with the tool. Ten responses indicated that they could not use the devices because they were not familiar with the devices (borrowed devices). Four responses indicated that their devices could not connect to the University Wi-Fi because their devices were not WLAN enabled (Appendix K). The second theme “Learning Engagement” has to do with the benefits of interacting with other students and teachers. All the responses from eighty-six participants that were able to access the tool with their devices indicated purposeful interactions and benefits. This may indicate the usefulness of the tool in engaging students in high-level interactions.

The 3rd code “Interaction Technology” has to do with the simplicity and functionality of the tool. Eighty-six responses agreed to the general usefulness of the tool. Though few of them responded that they could not play the videos on their devices, but were able to add and view comments. This may indicate the tool as being very beneficial and suitable for students for adding or viewing interactive comments. All the 86 responses reported benefits and accessibility of the tool with their mobile devices.

Other responses includes: recommendation for the improvement of the tool; *“after adding comments and clicking the submit button there should be a message ‘comment submitted successfully’ so that a comment will not be submitted more than once”*. Other response was that this tool should be made available for other courses in the institution.

## **5.6 Analysis of Interview Analysis**

Analysis of face-to-face interview with Lecturers of the f2f lectures in CS2 and CS4. The researcher conducted the interviews in the lecturers’ offices. These questions in Appendix G were asked. The researcher asked the questions and the lecturers gave responses.

Case Study Two (CS2): Lecturer of CSC 1010S, at University of Cape Town, South Africa:

The researcher asked the lecturer whether she thinks the tool will benefit her students she affirmed that the tool will assist her students. She answered *“... I see this tool as a supplement. I think it also helps students because in f2f lecture sometimes they don’t have the same level of understanding. With the tool they will be able to share their knowledge and those that did not understand everything can learn from the other...”*

She was also asked to comment on the functionality of the tool, whether the tool achieved its purpose. She commented *“Having gone through the comments made by the students during the evaluation, yes, it does looks like they are building up, one starts with suggesting one point and the second throws in a second point and by the end of the day it becomes more concrete and more understanding is achieved and also the discussion looks very interesting and the fact that sometimes students in class get interrupted and they miss something, they can always play and stop the video, which they can’t do when a lecturer is speaking, and at least with the tool they can stop, repeat, rewind and do all those kind of things.”*

Finally she was asked whether she will recommend the tool. She affirmed “Yes I would recommend it anytime, like a supplement, like I did before.” In addition she commented “...for the future it would be beneficial if the tool could work or run on less expensive phones, it might help many students who are disadvantaged, and don’t have capacity to buy expensive phones in the rest of Africa...” From across the four case studies, there were indications that students evaluated MOBILect with relatively expensive smartphones. This suggests that students increasingly owned smartphones. So designing MOBILect (web-based tool) to run on less expensive phones may not be necessary. In Case Study Four (Nigeria) 66 students used different types of Blackberry Phones to access MOBILect (See Appendix K). From across the four case studies students used expensive mobile devices (see Appendices H, I, J & K) to access MOBILect indicating that the cost of a mobile device may not actually be a limitation to the students.

Case Study Four (CS4): Lecturer of CSC 305, at Federal University of Technology, Akure. Nigeria:

The researcher asked the lecturer whether he thinks the tool will benefit his students; he responded that the tool will empower his students. He answered: *“There is no doubt in my mind that this is an innovative tool. I could see how the students enthusiastically engaged with the tool. This will definitely help classroom learning where they are many students and they cannot properly hear the voice of the lecturer from the back of the class room or miss out a sentence or part of the lecture. It will give students ample opportunity to replay the lecture as often as possible as a revision tool after classroom learning. I think this tool will also help students in this University who are having difficulties with understanding the lecture because English is not their mother tongue”*



He was also asked to comment on the functionality of the tool, whether the tool has achieved its purpose. He commented *“Yes I think it has worked for the purpose. I think the major benefit of this tool is interaction. Student-to-student interactions have assisted students to gain more insight into the lectures through other student’s perspectives. I can also gauge the level of understanding of my students during the classroom learning through this interaction.”*

Finally he was asked whether he will recommend the tool. He affirmed *“I will definitely recommend it to others. There is a colleague who is presently having a nightmare in handling his class of 700 students. I will definitely recommend this tool to him and others. Thanks for this tool”*

## **5.7 Summary**

In this chapter, focus group discussions, open-ended questions and interviews were analysed. The studies were designed to provide data showing the usefulness of MOBILect in engaging students in high-level interactions to foster deep learning. Here students engaged in high-level interactions through student-to-teacher interactions, student-to-content interactions and student-to-student interactions to foster deep learning. The next chapter discusses the results obtained in this chapter, the limitations of the study, recommendations and future work.

## **Chapter Six: Discussion and Conclusion**

### **6.1 Introduction**

The purpose of this study was to develop a theoretical mobile lecturing model where students can engage in high-level interactions with lecture vodcasts on their own personal mobile devices to foster deep learning. Another purpose was to explore how mobile devices enhance students' learning. Qualitative methods were utilized in this study in order to extract comprehensive data to answer all the research questions. Results enabled the researcher to draw conclusions about the data collected and make recommendations for future practice and study. This chapter is organized into these sections: Discussions, Conclusions, Limitations of study, and Contributions of study, Future works, Recommendations and Review of the researcher experiences.

### **6.2 Discussions**

The challenges of f2f lecture remains how best to improve and enhance learning in HEIs. In this study the following challenges were discussed as limitations to f2f learning in HEIs in South Africa: the challenge of medium of instruction, the challenge of large classes, and the challenge of academic under-preparedness. Many students in HEIs in South Africa who do not speak English as their mother tongue, coupled with different levels of academic preparedness and large classes, found it difficult to understand the f2f sessions. From the data obtained from the four case studies. Findings in this study shows that majority of the students do not speak English as their mother tongue; 78% participants for CS1, 87.5% participants for CS2, 100% participants for CS3 and 100% participants for CS4 ( see Table 5.1). In this study, it was also observed that student posted their comments using SMS Lingoes. This sort of interaction allowed students to post comments in a *language* that is understood by most of the students since they are used to sending SMS lingoes through their phones (Alejandro, 2011). These SMS 'lingoes' provided a shorthand form that allowed

students to rapidly post their comments and interact with other students, since most of the students are conversant with the *language*. SMS lingoes offered the students especially those who have difficulties with the language of teaching (for whom English is not their mother tongue), to communicate with peers using SMS lingoes, which they are familiar with (see section 5.3.5).

In evaluating MOBILect students interacted with the lecture vodcast to create their own meaning (student-to-content interaction). Dewey (1916) defines interaction as the learning process that occurs when students receive and translate the information passed to them from another into knowledge with personal application. Garrison (1989) argues that bidirectional communication is crucial and allows learners to construct meaningful knowledge. Bidirectional interactions between students are very crucial and important for learning. Findings in the study show that bidirectional interactions required the teacher to post prompting questions as triggers, which served to motivate students to engage in learning. O'Neill and McMahon (2005) gather that in a student-centred approach knowledge is constructed by students and the teacher is just a facilitator of learning rather than a presenter of information. MOBILect is learner-centred, where students engage in bidirectional interactions with lecture vodcasts to improve their learning by receiving and translating their knowledge. The learner-centredness depends mainly on social constructivism, which results in deep learning when learners are engaged in the construction of knowledge for themselves (Pear & Crone-Todd et al., 2002; Pulist, 2001). In this study, most of the students used their personal devices, which enhanced the device usability and interaction with the tool. The advantages of mobile lecturing in this study are: Mobile lecturing made lecture vodcasts universally accessible anywhere and at any time. Mobile lecturing provided educational opportunities outside the f2f lecture. Mobile lecturing also utilised the universal accessibility

of mobile technologies to support learning interactions. In mobile lecturing, students listened or watched lecture vodcasts on their devices at their convenience. Mobile lecturing encourages high-level interactions. Mobile lecturing increases knowledge creation and retention, and helped students to create their own knowledge and share the knowledge with peers after the f2f lecture. In the process of mobile lecturing, students interacted with lecture vodcasts on their mobile devices to foster deep learning (Warburton, 2003). The students interacted with the mobile lectures anywhere and at any time on their mobile devices. The interactions can be at the students' convenience outside the classroom. In this context, interaction does not occur on its own; the teacher sets a task that requires students to re-listen to a lecture and hereby motivate them to access MOBILect.

Sharples et al. (2007) in their theory of mobile learning suggest that a theory of mobile learning must be tested against the following criteria: Is it significantly different from current theories of classroom, workplace or lifelong learning? Does it account for the mobility of learners? Does it cover both informal and formal learning? Does it theorise learning as a constructive and social process? Does it analyze learning as a personal and situated activity mediated by technology? MOBILect is justified based on the theory of mobile learning (Sharples et al., 2007). MOBILect, a mobile lecturing tool is different from f2f lectures and supplement it. Students interacted with MOBILect after the f2f lectures, in informal settings as a continuation of formal learning (f2f lectures) with their peers to construct and share knowledge. Information gathered from the educators during interviews indicated that MOBILect was a useful complement to f2f sessions. Students moves from the f2f lecture (formal) to learn with MOBILect in informal settings. MOBILect allows a constructive and social process where students interact with each other to create and share knowledge. Students interact at their own convenience (different place and different time)

with their mobile devices. Ngwenya et al. (2004) argue that the interaction among two or more people depends on their relative locations in time and space (see Table 3.1). In space 1, students interact in the same place at the same time. In space 2, students interact in different places at the same time. In space 3 students interact in the same place but at a different time. In space 4, students interact in different places at different times. In CS1, CS2 and CS4 interactions took place in space 1. CS3 interactions took place in space 4. Further studies could explore space 2 and space 3.

Cheon et al. (2012) highlighted four types of learning approaches supported by mobile devices and prominent in higher education: Individualized learning, allowing students to pace learning at their own speed. Situated learning, this is realized when students use mobile devices to learn within a real context. Collaborative learning, when students use mobile devices to interact and communicate with other students. Informal learning, realized when students learn outside the classroom at their convenience. Exploration of m-learning outside the classroom is considered beneficial where students have sufficient time to interact with their mobile devices without the restriction of time and space prevalent in f2f lectures. Data collected from students in this study indicated the benefit of MOBILect, as being not restricted by space or time, where students can engage in learning at their convenience. Further studies could explore collaborative learning, which is not addressed in this study though could be implemented in the MOBLEC model.

### **6.3 Conclusions**

This section contains conclusions based on the findings from the studies. Conclusions are organized by research questions and are supported by data from focus group discussions or open-ended questions

### **6.3.1 Review of research questions**

Research Question 1: In what ways does mobile lecturing engage learners to foster deep learning? The purpose of this study was to explore how learners engage with lecture vodcasts on their mobile devices to foster deep learning through mobile lecturing to overcome the challenges of academic under-preparedness; difficulties in understanding English language and large class. Data collected from analysis of student comments (see section 5.3) indicated that students were able to learn using MOBILect. From the interactions that occur in Case Study One, student-to-student interactions were engaged at a high-level with 29 comments posted, hence mobile lecturing has engaged learners in deep and meaningful learning. From the interactions that occur in Case Study Two, student-to-content interactions were engaged at a high-level with 21 comments posted, hence mobile lecturing has fostered deep and meaningful learning. From the interactions that occur in Case Study Three, Student-to-content interactions were engaged at a high-level with 5 comments, hence deep and meaningful learning has taken place. From the interactions that occur in Case Study Four, student-to-content interactions were engaged at a high-level with 151 comments posted, hence deep and meaningful learning has taken place. During the four evaluations, students interacted with lecture vodcast on MOBILect (student-to-content interaction) and students interacted with other students (student-to-student interaction) in bidirectional interactions. This level of interactions in mobile lecturing is higher than the interaction inherent in f2f lecture or vodcasting where interaction is unidirectional and limited to one-student interaction. In f2f lectures students listen to the lecture delivered by the teacher and take notes. This interaction is also unidirectional and limited to one-student interaction. In mobile lecturing the interaction is bidirectional; students interact with lecture vodcasts on their mobile devices and with other students to enhance their learning. Students are exposed to other people's concepts and ideas. Using the MOBILect tool, the effectiveness of mobile

lecturing in ensuring a high-level engagement and fostering deep learning was determined. Teachers' responses through the analysis of the interview data indicated that MOBILect is a good supplement tool for f2f lectures and has the ability to enhance students' learning.

Research Question 2: How do mobile devices enhance students' learning? Another purpose of the study was to explore how mobile devices serve to enhance students' learning. 100% participants for CS1 (see Table 5.1) 100% participants for CS2 (see Table 5.1), 100% participants for CS3 ( see Table 5.1) and 86% participants for CS4 ( see Table 5.1) indicated that they were able to access MOBILect on mobile devices. Though some students encountered difficulties because of the limitations posed by their small screen devices, but were able to navigate through because of their familiarity with their mobile devices. In CS4 10% of participants could not access MOBILect because they were not familiar with their borrowed mobile devices. Most of the participants accessed MOBILect with their own personal devices. Kukulska-Hulme (2007) indicates that when mobile devices belong to users, the user's level of familiarity with the device helps to avoid many potential usability problems and focus on the learning task. 4% participants in CS4 could not connect to the Wi-Fi network because their devices were not WLAN (Wide local Area Network) enabled.

Research Question 3: To what extent are learner-centred interactions facilitated through a mobile lecturing tool? Data collected indicated students engaged in high-level interactions (student-to-teacher, student-to-content, student-to-student (see Section 5.3) with MOBILect. 100% participants for CS1, 100% participants for CS2, 100% participants for CS3 and 86% participants for CS4 found the tool resourceful. Anderson (2003) argues that "deep and meaningful formal learning is supported as long as one of these three forms of interaction is at a high level" (student-to-teacher; student-to-student; student-to-content). MOBILect is learner-centred; in the evaluations (see Section 5.3) students interacted with MOBILect to

construct his/her own knowledge. Students watched lecture vodcasts on MOBILect, created their own knowledge and learned at their own pace. F2f learning is usually teacher-centred, where the teacher is the one directing the pace of learning, as compared with MOBILect where students control their pace of learning while the teacher assumed the role of a tutor (Hoven, 1999; Kukulska-Hulme, 2010; Pulist, 2001). Thus the significance of this study is that it bridges the two- teacher-centred (i.e. f2f lectures) and learner-centred (i.e. MOBILect mediated interactions).

#### **6.4 Limitations of study**

The study was limited to undergraduates since they are more vulnerable to challenges of low-level engagement prevalent in f2f learning. Also the study was limited to Student-to-Student interaction, Student-to-Teacher interaction, and Student-to-Content interactions of Anderson (2003) because students' enhanced learning was the focus of the studies. Teacher-to-Teacher interaction, Teacher-to-Content interaction and Content-to-Content interaction were not considered in the studies.

#### **6.5 Contributions of Study**

The contributions of this research are two-fold. Theoretical contribution: This study is significant because it proposed a mobile lecturing model, the MOBLEC model. The affordance of mobile devices has positively affected the mobile lecturing process. Mobile lecturing engages students in high-level interactions with lecture vodcasts on their students' devices to foster deep learning. Triangulation approach which falls within qualitative research design was used to acquire data through focus group discussions, open-ended questions and interviews in the course of the studies. The data analysed provided positive indicators as to the usefulness and effectiveness of mobile lecturing in engaging students to foster deep learning. Mobile lecturing, through augmenting and accessing lecture vodcasts on students'



mobile devices at anywhere and at any time, with an affordance to comment, has potential for empowering students who might be struggling to understand f2f sessions.

In addition, this study contributes to the field of computer science in terms of software development: A Web-based HTML 5 software tool was developed for the purpose of evaluating the effectiveness of mobile lecturing. This tool performs two major functions:

- i) Interaction with video content on mobile devices.
- ii) Harvesting individual user comments based on watching a lecture video and the aggregated comments becomes a valuable educational resource.

## **6.6 Future Works**

Future work could be to include the other three interactions from Anderson (teacher-to-teacher, teacher-to-content and content-to-content) that are not applicable to this study to enrich the contents generated by teachers. Further future work might be to change the mock-up design for MOBILect to the initial mock-up design, where the lecture vodcast will be further divided into segments (see Figure 3.5). This is to reduce the file size for easy download and minimize bandwidth usage. Another field for future research may be to develop an offline version of MOBILect where students can access MOBILect when they are not connected to any network. It might also be possible to display more lecture vodcasts on MOBILect. MOBILect displays only the presentation format of MP4 from UCT Opencast out of the four available media files: Presenter.avi (Video Clip), Presenter.mp4 (Video Clip), Presenter.mp3 (MP3 Format Sound), Presentation.mp4 (Video Clip), Presentation.avi (Video Clip). Future research might be how to improve the tool to assist the handicapped students in HEIs to enhance their learning by converting video to text and audio formats. How can mobile lecturing adapt learning content to the context of the student? How can mobile

devices be used to achieve this goal? These questions might also be a consideration for future work.

## **6.7 Recommendations**

Based on the results of this study, the following suggestions are offered to support the effective use of mobile lecturing as a supplement to f2f learning:

- I. Students should be encouraged to use their own personal device for m-learning.
- II. Educators should encourage their students to engage with mobile lectures after the f2f learning.
- III. More software solutions should be designed to support mobile lecturing.

MOBILect has been successfully evaluated at UCT in South Africa, BUSE, Zimbabwe and FUTA, Nigeria.

## **6.8 Review of the Researcher Experiences**

As an educator born and bred in the Nigerian context and a PhD student in the South Africa context has actually influenced the way I conducted this study.

I was born into a polygamous family with many children, where each child virtually struggles to survive and succeed. My mother tongue is Yoruba. Our major mode of speech at home was Yoruba and most of the time at the public school which I attended. In Nigeria, public schools are run by governments and students pay a small amount for school fees compared to private schools where the fees are high and only the rich and privileged can afford to send their children. Private schools have good and qualified teachers with good salary to motivate them to teach the students, unlike public schools where salaries of most teachers are poor and some subjects even lack teachers. I remembered during my high school there were no teachers to teach us further mathematics and biology.

I was lucky that my mother was educated, so she encouraged me to be educated despite the fact that education was not considered beneficial to the girl-child. I struggled through high school; I remember being sent home on several occasions for lack of payment of school fees. Speaking and writing English language was difficult for me because I do not engage in speaking it quite often, though we were taught in English language in high school, we were not encouraged to speak it. I developed flair for science subjects and I passed all the subjects with distinctions in one sitting except English, which I managed to pass with a credit.

The struggle continued for me when I gained admission to the university. It was pretty difficult for me that I nearly called it quit. It was easier for me to understand the English spoken at the high school because the teachers spoke English in our local accent, but in the university the lecturers spoke with foreign accent that made it difficult for me to understand what they were saying. Most of the teachers then were unwilling to repeat their lectures.

In my first year I was so discouraged and almost called it quit, but I can now vividly remember my mother's words of encouragement:

"Rome is not built in a day, continue to listen steadfastly and you will get used to it. Remember my daughter, in any situation of life, never call it quits."

I held to these words and continued and I did not give up though my grades were so much affected during my first year. I completed my university education successfully and further pursued postgraduate studies (Masters), which was now relatively easy for me to accomplish.

I got a lecturing job at the university. I saw how students struggle through the university system especially the first year students who came from public schools, because

few of them came from private schools. I tried to assist my students by encouraging them to ask questions and I also indicated my willingness to repeat any sentence that any student might miss during my lecture, but I found this overwhelming because of the large class size. There was a particular class (year one students), in which I taught over 800 students in a lecture hall, where some of the students had to stand outside because the lecture hall could not accommodate them. I found this quite cumbersome. Many times I thought about how to use my discipline to help my students, especially the female students. I am sorry if I am biased but I knew the experiences I faced as a girl-child and as a mother (I am blessed with four children: three girls and one boy).

When my university opted to send me for PhD studies in South Africa with Education Trust Funds, I was happy for the opportunity to go for my PhD in the ICT4D group in the Department of Computer Science, University of Cape Town, South Africa where I can apply my knowledge of computer science to education to enhance learning in South Africa and also Nigeria.

It was not convenient for me, because I have to leave my husband and children in Nigeria for three years to pursue a PhD in South Africa. But I am happy the programme has being worthwhile by this study I was able to conduct. I believe there are immense benefits to Higher Education in South Africa, Zimbabwe, Nigeria and possibly other developing countries of Africa. It is against this background that I undertook this study, towards an interactive mobile lecturing model: a higher-level engagement for enhancing learning.

Finally, I would also like to comment on my experiences with my two supervisors; Professor Dick Ng'ambi of Centre for Educational Technology (UCT) and Dr Antoine Bagula, Department of Computer Science, (UCT). They gave me academic and moral

support especially when I was pregnant with my last child during the course of the programme.

I also want to state that I was one of the ten women in Sub-Sahara Africa who got the 2011 Loreal-Unesco Regional fellowship in recognition of my research work in enhancing learning in higher education through design and implementation of mobile lecturing software.

### **Publications from Thesis**

- I. Olutayo Boyinbode, Antoine Bagula, Dick Ng'ambi (2012) 'An Interactive Mobile Learning System for Enhancing Learning in Higher Education" Proceedings of the IADIS International Mobile Learning Conference Berlin, Germany March 11-13 2012, pg331-334
- II. Olutayo Boyinbode, Antoine Bagula, Dick Ng'ambi (2012) 'A Mobile Learning Application for Delivering Educational Resources to Mobile Devices" International IEEE Conference on Information Society (i-society) London, 25-28th June 2012, Pg120-125
- III. Olutayo Boyinbode, Antoine Bagula, Dick Ng'ambi (2011) " An Opencast Mobile Learning Framework for Enhancing Learning in Higher Education" International Journal of u- and e- Service, Science and Technology Vol. 4, No.3, September 2011pg 11-18
- IV. Olutayo Boyinbode, Dick Ng'ambi, Antoine Bagula, (2012) "An Interactive Mobile Lecturing Tool for Aggregating Learning Resources" Accepted to appear in the International Journal for Infonomics (IJI),Volume 5, Issues 3/4, ISSN: 1742 4712
- V. Olutayo Boyinbode, Dick Ng'ambi, Antoine Bagula, (2012) "An Interactive Mobile Lecturing Model: Enhancing Student Engagement With Face-To-Face Sessions" Submitted to International Journal of Mobile and Blended Learning

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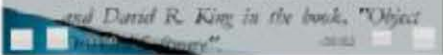
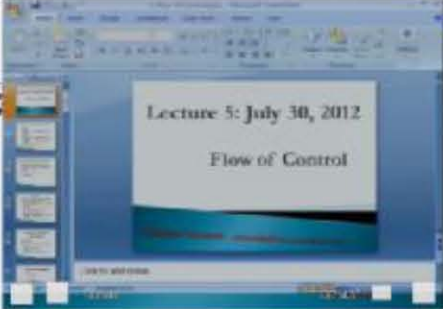
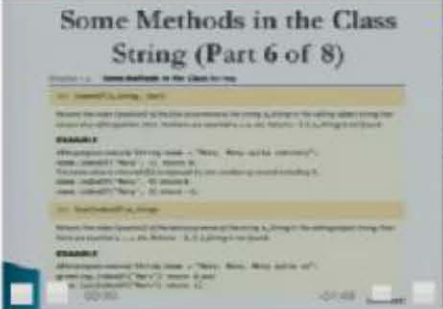

# APPENDIX A

LCT OpenCast

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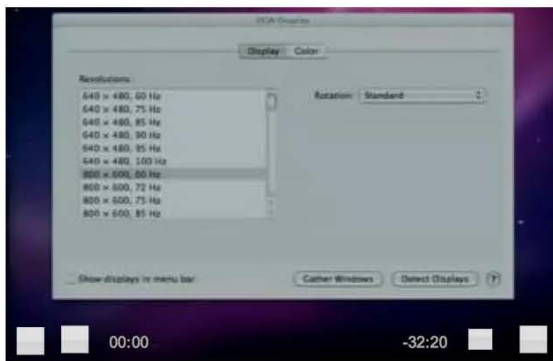


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<p>Lecture 7: August 1, 2012</p> <p>Classes and Methods I</p> 	<p><a href="#">CSC1016S,2012 A7</a></p> <p>Muthoni Masinde</p> <p>2012-08-01T09:00:00Z</p> <p>0 comments</p> <p>Source: Opencast</p> <p><a href="#">View All Comments</a></p>
<p>Definitions II</p> <p>• "Object orientation provides a new paradigm for software construction. In this new paradigm, objects and classes are the building blocks, while methods, messages and inheritance produce the primary mechanisms".- Ann L. Winblad, Samuel D. Edwards and David R. King in the book, "Object Oriented Programming".</p> 	<p><a href="#">CSC1016S,2012 A6</a></p> <p>Muthoni Masinde</p> <p>2012-07-31T09:00:00Z</p> <p>38 comments</p> <p>Source: Opencast</p> <p><a href="#">View All Comments</a></p>
<p>Lecture 5: July 30, 2012</p> <p>Flow of Control</p> 	<p><a href="#">CSC1016S,2012 A5</a></p> <p>Muthoni Masinde</p> <p>2012-07-30T09:00:00Z</p> <p>1 comments</p> <p>Source: Opencast</p> <p><a href="#">View All Comments</a></p>
<p>Some Methods in the Class String (Part 6 of 8)</p> 	<p><a href="#">CSC1016S,2012 A4</a></p> <p>Muthoni Masinde</p> <p>2012-07-26T09:00:00Z</p> <p>0 comments</p> <p>Source: Opencast</p> <p><a href="#">View All Comments</a></p>
	<p><a href="#">CSC1016S,2012 A3</a></p>

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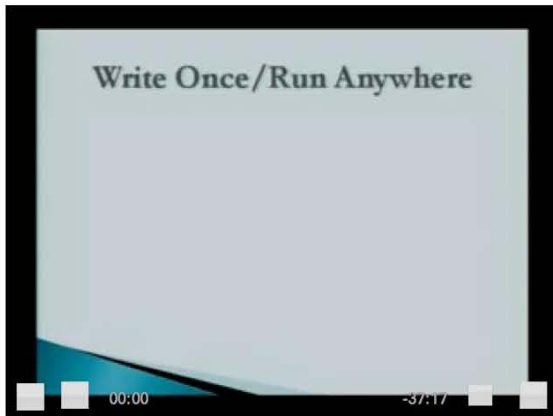


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Hussein Suleman

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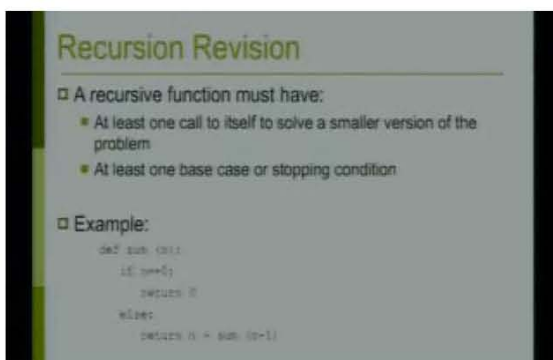
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## **APPENDIX B**

### **Consent Form**

Student Name:

Evaluation Student No:

I hereby agree to take part in this evaluation session.

I understand that I will watch a recorded Lecture and make interactive comments using my own mobile device which will be followed by a focus group discussion with the other participants and researcher.

I understand that I will also take part in one to one interview with the researcher

I understand the whole evaluation session will be recorded

I understand that when reporting on results the researcher will not use my personal information

I agree to forgo of any rights that may arise from the data I provide or the research results of the project.

Signature

Date:

Olutayo Kehinde Boyinbode  
PhD Student  
ICT4D Lab  
Department of Computer Science  
University of Cape Town,  
South Africa

# APPENDIX C

	<b>RESEARCH ACCESS TO STUDENTS</b>	<b>DSA 100</b>
-----------------------------------------------------------------------------------	--------------------------------------------	----------------

## NOTES

1. This form must be FULLY completed by applicants that want to access UCT students for the purpose of research.
2. Return the completed application form together with your research proposal to: Moonira.Khan@uct.ac.za; or deliver to: Attention: Executive Director, Department of Student Affairs, North Lane, Steve Biko Students' Union, Room 7.22, Upper Campus, UCT.
3. The turnaround time for a reply is approximately 10 working days.
4. NB: It is the responsibility of the researcher/s to apply for and to obtain ethical clearance and access to staff and/or students, respectively to the (a) Faculty's 'Ethics in Research Committee' (EIRC) for ethics approval, and (b) Executive Director, HR for approval to access staff for research purposes and the (c) Executive Director, Student Affairs for approval to access students for research purposes.
5. For noting, a requirement of UCT (according to Senate policy) is that items (1) and (4) apply even if prior clearance has been obtained by the researcher/s from any other institution.

## SECTION A: RESEARCH APPLICANT/S DETAILS

Position	Staff / Student No	Title and Name	Contact Details (Email / Cell / land line)
A.1 Student Number	BYNOLU001	MRS OLUTAYO BOYINBODE	oboyinbode@cs.uct.ac.za
A.2 Academic / PASS Staff No.			
A.3 Visiting Researcher ID No.			
A.4 University at which a student or employee	UCT	Address if <u>not</u> UCT:	
A.5 Faculty/ Department/School	SCIENCE		
A.6 APPLICANTS DETAILS If different from above	Title and Name	Tel.	Email

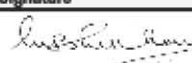
## SECTION B: RESEARCHER/S SUPERVISOR/S DETAILS

Position	Title and Name	Tel.	Email
B.1 Supervisor	DR ANTOINE BAGULA	27 021 6504315	bagula@cs.uct.ac.za
B.2 Co-Supervisor/s (a)	ASSOC PROF DICK NGAMBI	27 021 6504760	Dick.Ngambi@uct.ac.za

## SECTION C: APPLICANT'S RESEARCH STUDY FIELD AND APPROVAL STATUS

C.1 Degree (if a student)	PHD COMPUTER SCIENCE
C.2 Research Project Title	AN INTERACTIVE MOBILE LEARNING SYSTEM
C.3 Research Proposal	Attached: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
C.4 Target population	COMPUTER SCIENCE STUDENTS
C.5 Lead Researcher details	If different from applicant:
C.6 Will use research assistant/s	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
C.7 Research Methodology and informed consent	FOCUS DISCUSSION GROUP TO BE HELD AMONG THE STUDENTS. STUDENTS WILL BE ASKED TO READ AND SIGN A CONSENT FORM
C.8 Ethics clearance status from UCT's Ethics in Research Committee (EIRC)	Approved by the EIRC: Yes <input type="checkbox"/> No <input type="checkbox"/> Awaiting response: <input checked="" type="checkbox"/> If yes, attach copy and state the date and ref. no of EIRC approval: Date of application if awaiting response: 20/04/2012

## SECTION D: APPLICANT/S APPROVAL STATUS FOR ACCESS TO STUDENTS FOR RESEARCH PURPOSE (To be completed by the ED, DSA or Nominee)

APPROVAL STATUS	Approved / Not Approved	Applicant's Ref. No.:	Comments:	
	Yes <input checked="" type="checkbox"/> / No <input type="checkbox"/>	BYNOLU001 / O BOYINBODE Ref No.	RESEARCH ACCESS TO STUDENTS FOR RESEARCH PURPOSES MAY ONLY BE UNDERTAKEN AFTER FACULTY ETHICS APPROVAL HAS BEEN RECEIVED.	
APPROVED BY:	Designation	Name	Signature	Date
	Executive Director Department of Student Affairs	MBM KHAN		7 / 05 / 2012

## APPENDIX D

Department of Environmental and Geographical Science  
University of Cape Town  
RONDEBOSCH 7701  
South Africa

e-mail: [Michael.meadows@uct.ac.za](mailto:Michael.meadows@uct.ac.za)  
phone : + 27 21 650 2873  
fax : +27 21 650 3791



28<sup>th</sup> May 2012

Mrs Olutayo Kehinde Boyinbode  
Department of Computer Science  
University of Cape Town  
[oboyinbode@cs.uct.ac.za](mailto:oboyinbode@cs.uct.ac.za)

Dear Kehinde Boyinbode

### **An interactive mobile learning system**

I am pleased to inform you that, having scrutinized the details of your above-named application for research ethics clearance, the Faculty of Science Research Ethics Committee has approved it in terms of its attention to ethical principles.

Your approval code is: SFREC 014\_2012

I wish you success in the work involved.

Yours sincerely

A handwritten signature in cursive script that reads "M Meadows".

Michael E Meadows  
Professor and Head of Department  
Chair: Science Faculty Ethics in Research Committee

## **APPENDIX E**

### **Focus Group Discussion Questions**

#### **Device Usability (AB) Questions:**

1. Describe your experience of using this tool on your own mobile devices?
2. What are the limitations posed by mobile devices?

#### **Learning Engagement (BC) Questions:**

3. Student-to-Content Interactions:
  - a. How would you describe your learning experience? What did you learn through this interaction?
  - b. Comment on the way you engaged with the lecture through this tool?
  - c. How would you describe the benefits to you for using this tool?
4. Student-to-Student interactions:
  - a. How did your seeing what other students had commented help you?
  - b. Did seeing what other students were commenting affect your comments? Please describe.
  - c. Were you able to benefit from the interaction? Please state the benefits
  - d. How would you describe what you learnt from other students?
5. Student-to-Teacher Interactions:
  - a. Describe how this tool helped you in interacting with the lecturer?
  - b. How is the interaction with the lecturer through this tool different from f2f?
  - c. Was there anything you will rather ask the lecturer through this tool than in the f2f sessions? Why?

#### **Interaction Technology (AC) Questions:**

6. Comment on the functionality of the tool? Did it work for the purpose for which it was designed?
7. Describe your experience of knowing what to do or understanding the tool? Is the tool simple enough for you to easily use?
8. How would you recommend this tool is improved?
9. Please give advice to students who will be using this tool in future? Recommendations/ caution/ hints



## **APPENDIX F**

### **Open-Ended Questions**

Student Matric No:

Name and type of Mobile Device:

Mother Tongue (Home Language):

Gender:

Name of Course being evaluated:

1. What are your experiences in using this tool on your own mobile device and what are the limitations posed by your mobile device?
2. How would you describe your learning experience and how would you describe the benefits you derived from using this tool?
3. How would you describe what you learnt from other students?
4. How is the interaction with the lecturer through this tool different from f2f lecture?
5. Comment on the functionality of the tool, did it work for the purpose for which it was designed and how would you recommend this tool be improved?

## **APPENDIX G**

### **Interview Questions**

1. Do you think this tool will benefit your students?
2. Comment on the functionality of the tool? Did it work for the purpose for which it was intended?
3. Would you recommend this tool to your colleagues?

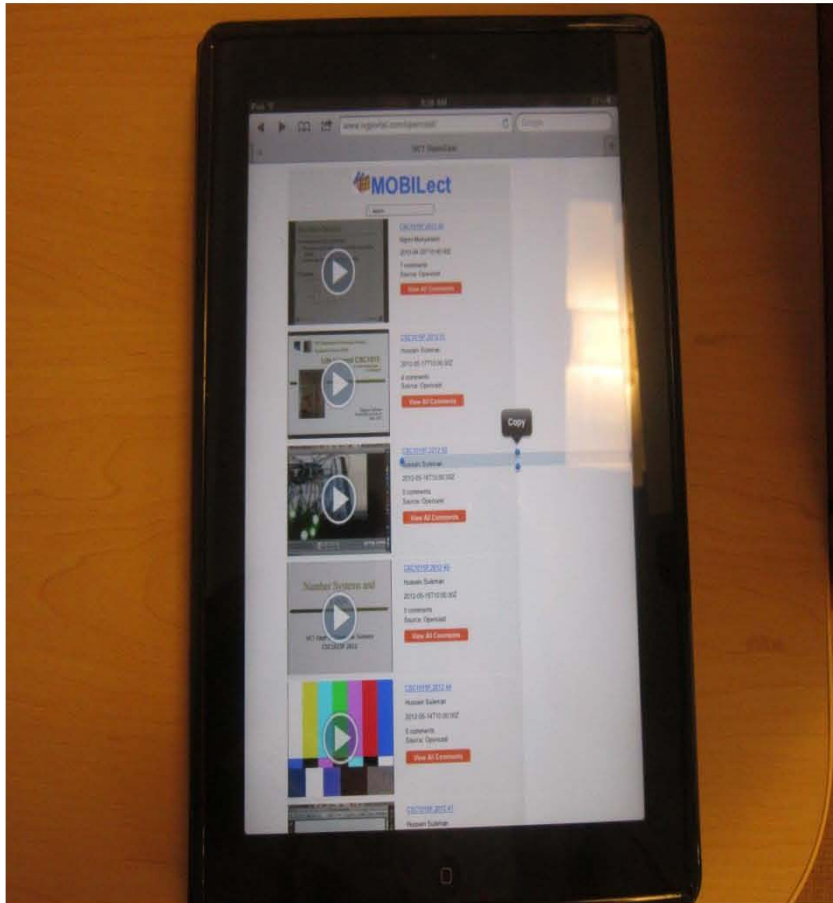
University of Cape Town

## APPENDIX H

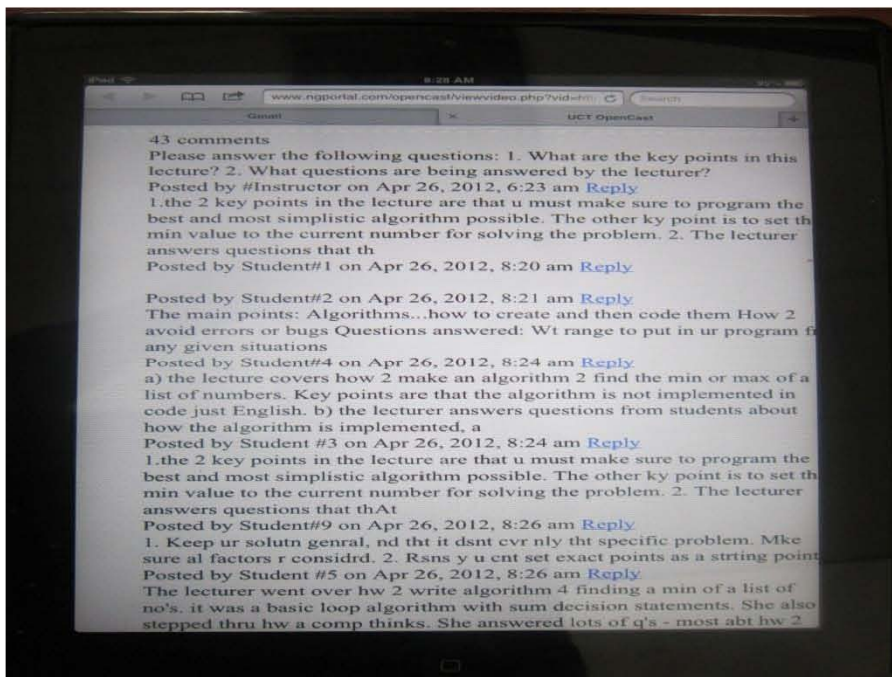
### Case Study One: Mobile devices classified according to their O/S

O/S	Mobile Devices				
Ios	iPhone 3G	iPad	iPad2	iPod Touch	iPhone 4G
Android	Samsung Galaxy S	Samsung Galaxy Y			
Blackberry	Blackberry Bold (9790)				

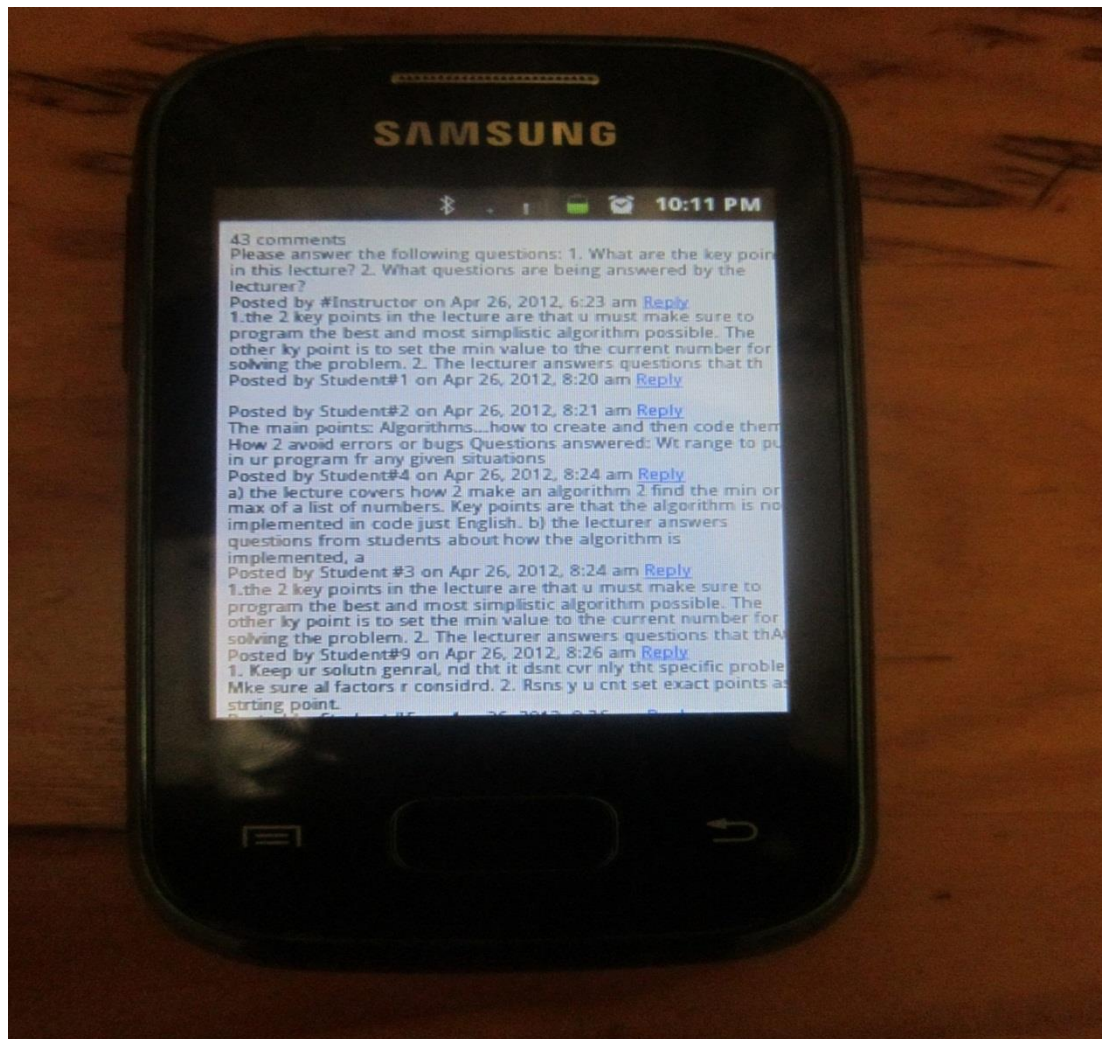
Some CS1 devices displaying MOBILect:



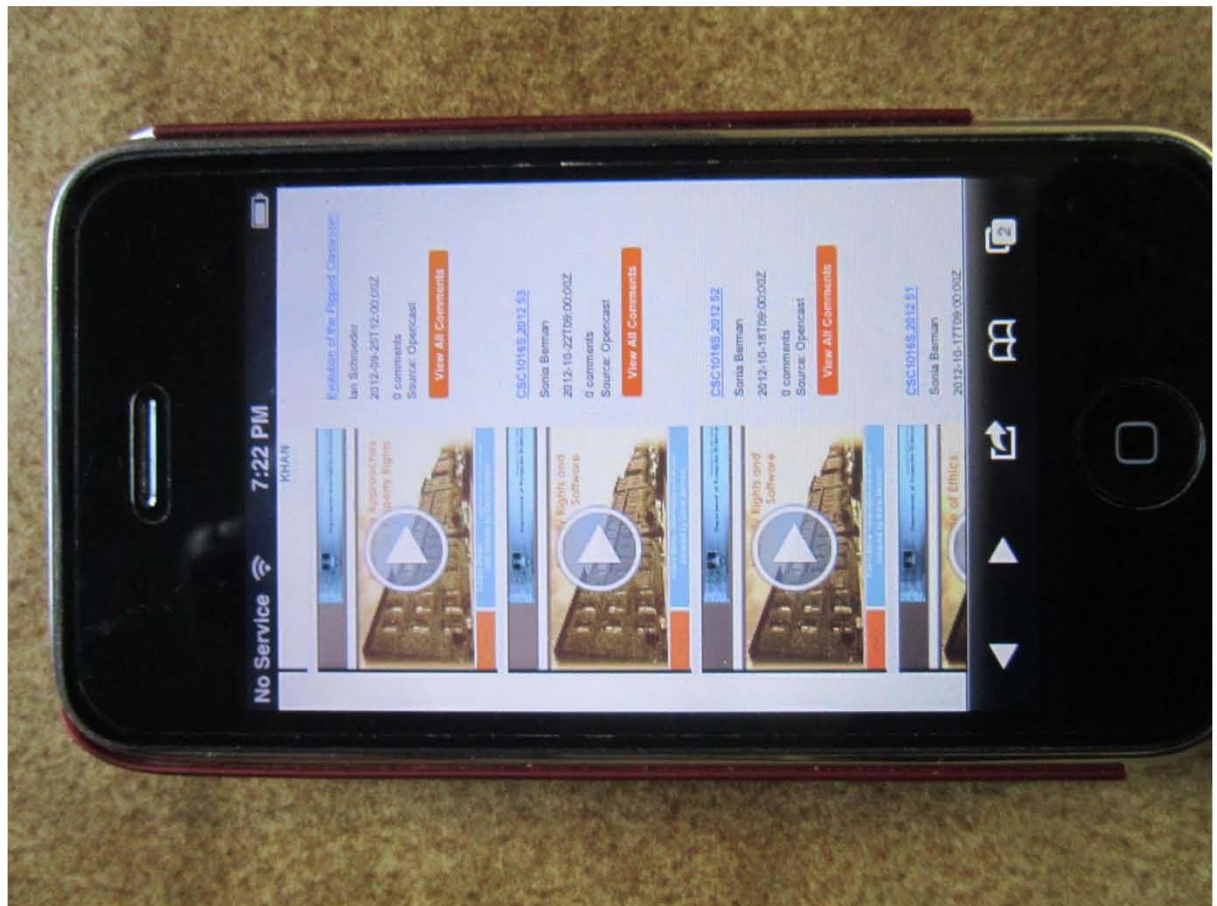
iPad



iPad

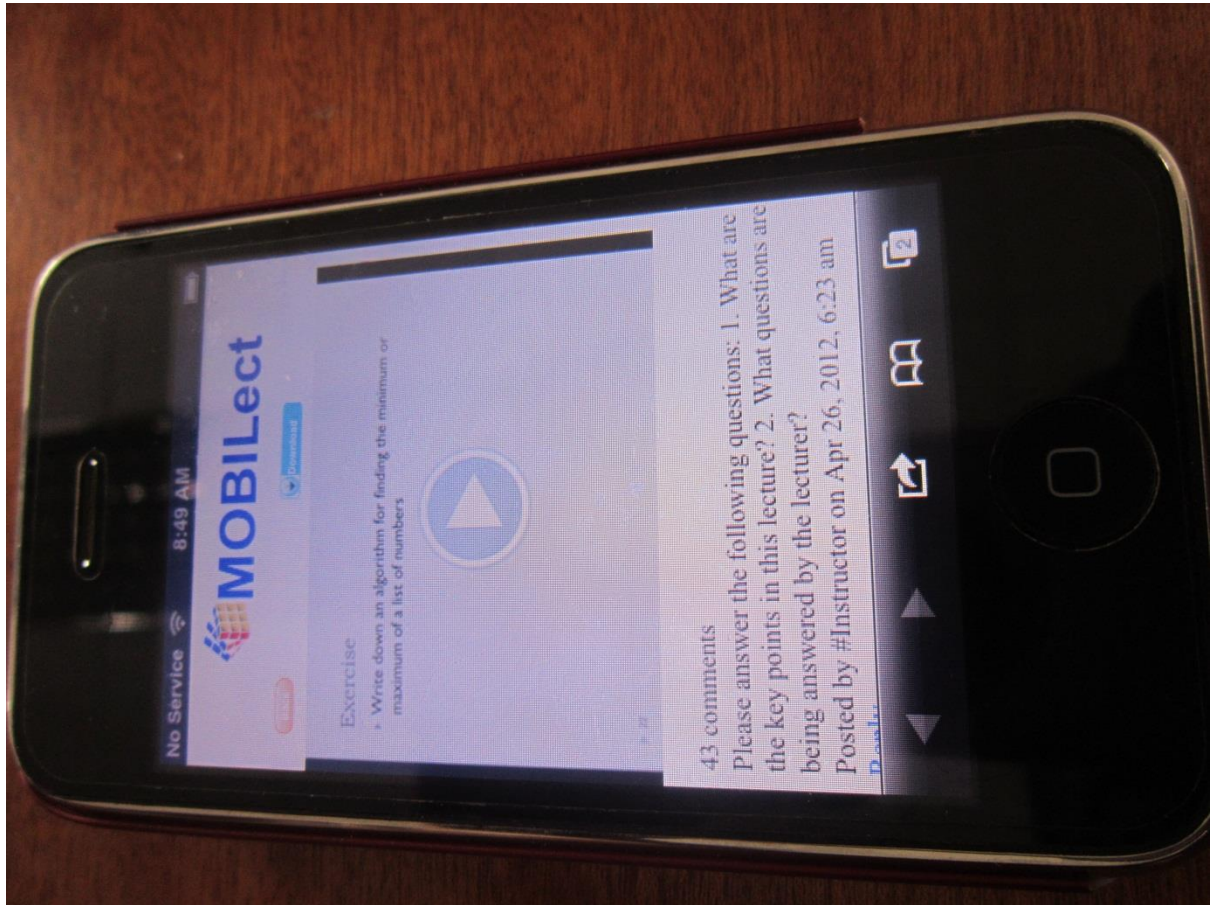


Samsung Galaxy Y



iPhone 3G





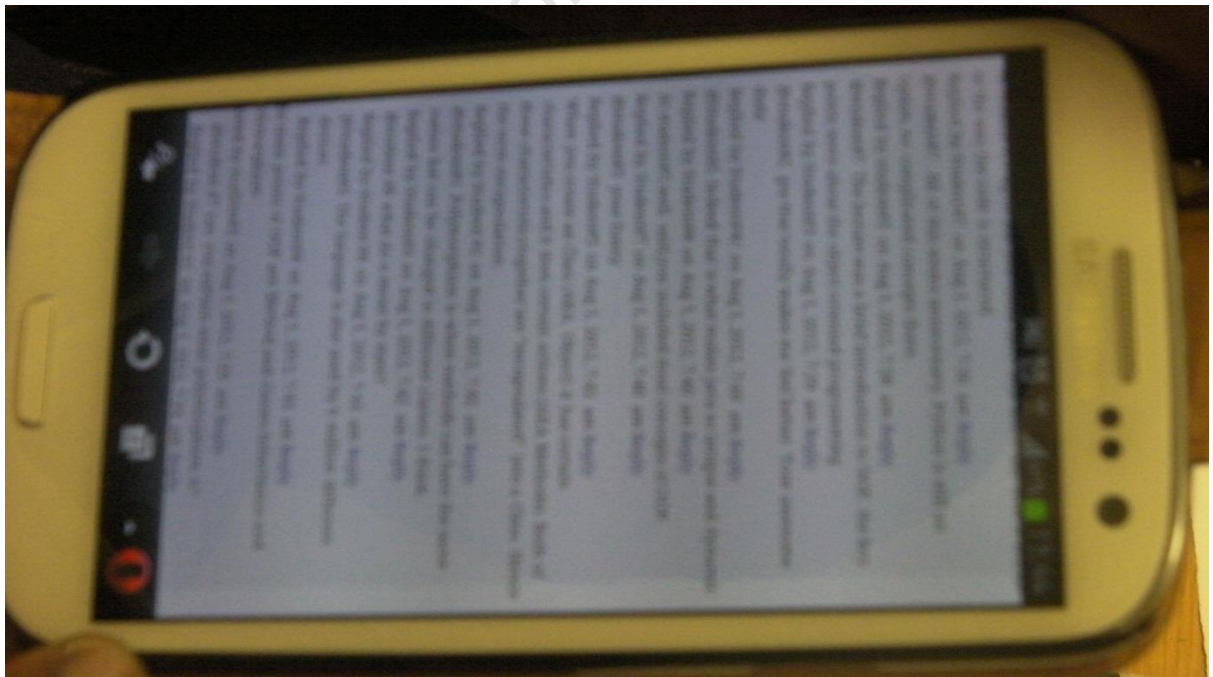
iPhone 3G

## APPENDIX I

### Case Study Two: Mobile devices classified according to their O/S

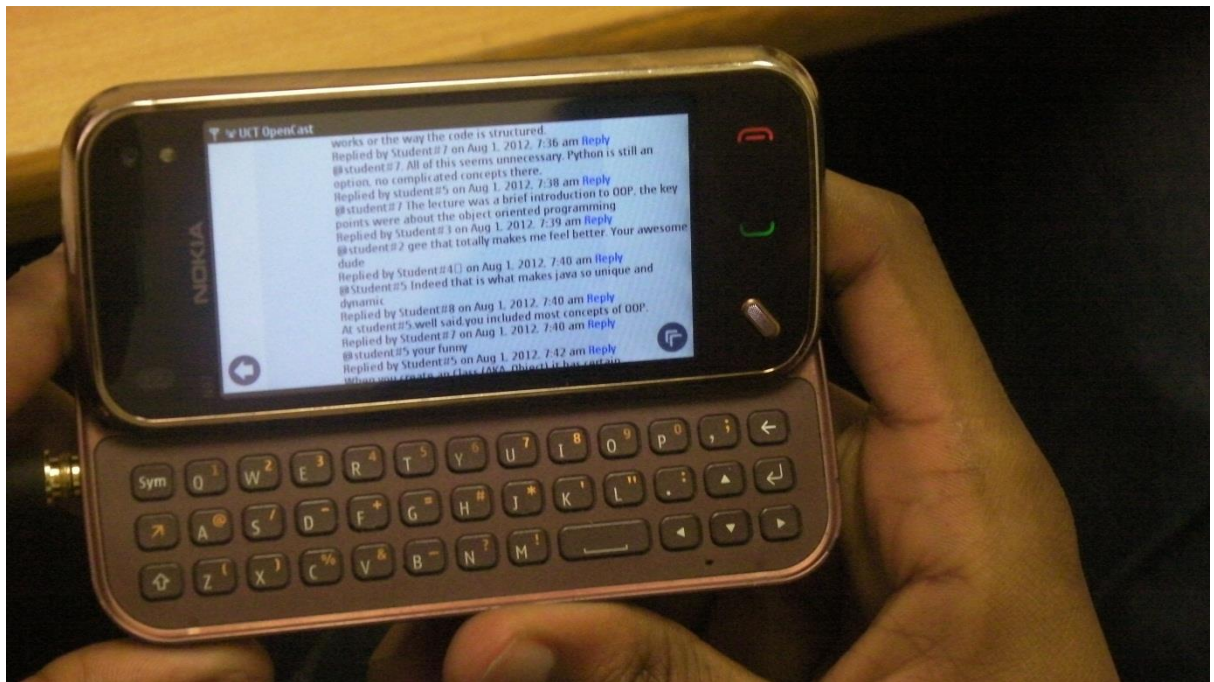
O/S	Mobile Devices				
iOS	iPod touch	iPhone 3G	iPad		
Android	Samsung Galaxy SIII				
Blackberry	Blackberry Curve8520				
Symbian	Nokia N97 Mini				

#### CS2: Some devices displaying MOBILect



Samsung Galaxy SIII





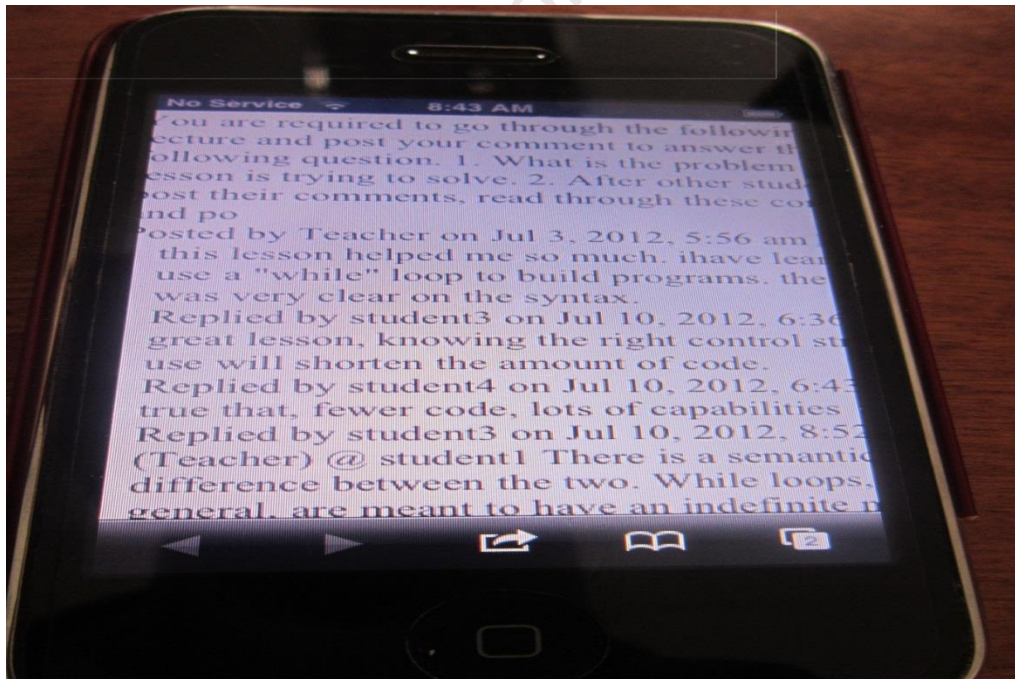
**Nokia N97 Mini**

## APPENDIX J

### Case Study Three: Mobile devices classified according to their O/S

O/S	Mobile Devices				
iOS	iPad	iPhone 3G			
Android	Samsung Galaxy S				
Blackberry	BlackberryCurve8520				
Symbian	Sony Ericsson Xperia X10				

Some CS3 devices displaying MOBILect:



iPhone 3G

## APPENDIX K

### Case Study Four: Mobile devices classified according to their O/S

O/S	Mobile Devices
iOS	iPad iPhone 3G
Android	Samsung Galaxy Y Samsung P1010 Galaxy Tab Sony Ericsson Xperia X10
Blackberry	8520 Curve 9000 Bold 9300 Curve 9320 Curve 9330 Curve 9360 Curve 9650 Bold 9700 Bold 9780 Bold 9790 Bold 9800 Torch 9900 Bold Touch 9930 Bold Touch

Symbian	Nokia N97 Mini Nokia C3 Nokia C7 Nokia E5 Nokia E63 Nokia 5800 Nokia 6710 Navigator
Opera mini	Nokia C1 Nokia C2 Nokia 2700 Nokia X2 Sony Ericsson W995

	Mobile Devices	No of students	Borrowed devices connect	Borrowed not connect
1	iPad	3		
2	iPhone 3G	3		
3	Samsung Gal. Y	1		
4	Samsung P1010	2		
5	Sony Ec. Xperia	1		1
6	8520 Curve	6		3
7	9000 Bold	1		
8	9300 Curve	6		3
9	9320 Curve	4		
10	9330 Curve	3		
11	9360 Curve	4		
12	9650 Bold	8		
13	9700 Bold	8	1	
14	9780 Bold	4		
15	9790 Bold	4	2	
16	9800 Torch	9	3	
17	9900 Bold Touch	5	2	
18	9930 Bold Touch	4	2	

19	Nokia N97 Mini	4		
20	Nokia C3	2		
21	Nokia C7	3		
22	Nokia E5	3		
23	Nokia E63	3		
24	Nokia 5800	2		2
25	Nokia 6710 N.	2		1
26	Nokia C1	1		
27	Nokia C2	1		
28	Nokia 2700	1		
29	Nokia X2	1		
30	Sony Eric. W995	1		

Total No of Students 100

Black berry users 66

Nokia users 23

Ipad & Iphone users 6

Samsung users 3

Sony Ericsson users 2

#### **4 Mobile devices that could not connect to network due to lack of WLAN**

Nokia C1

Nokia C2

Nokia 2710

Nokia X2

#### **Borrowed Mobile devices that worked with MOBILect**

Mobile Devices	Number of Devices
----------------	-------------------

Blackberry 9800	3
-----------------	---

Blackberry 9790	2
-----------------	---

Blackberry 9930	2
-----------------	---

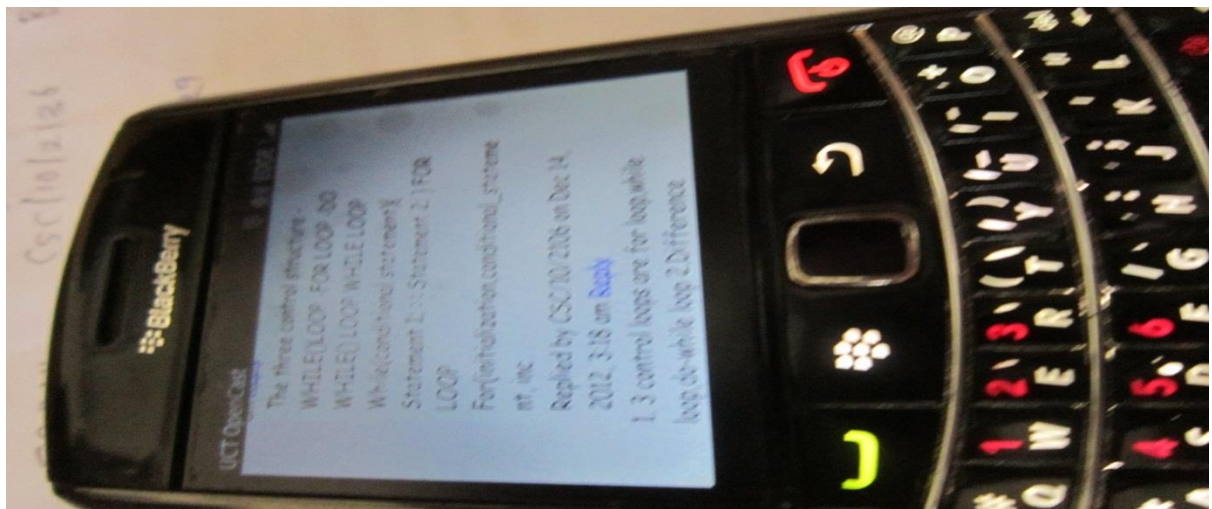
Blackberry 9900	2
-----------------	---

Blackberry 9700	1
-----------------	---

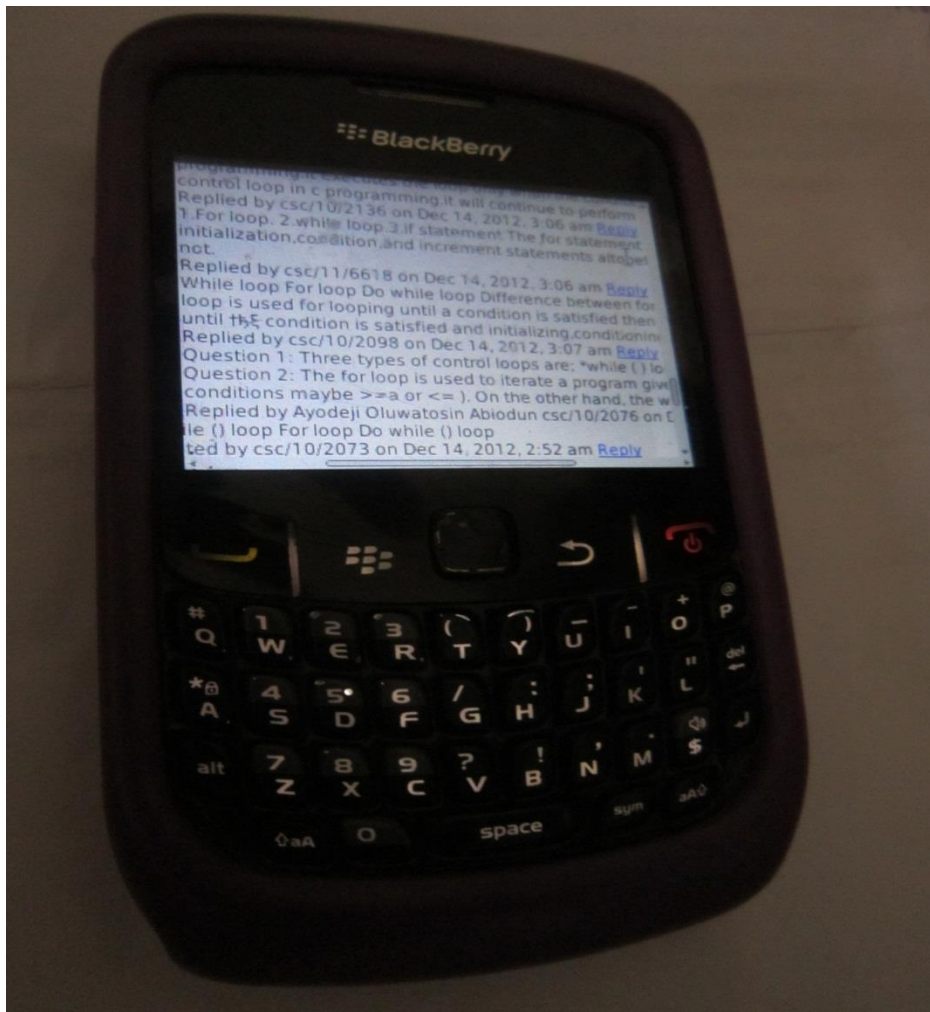
## Borrowed devices that did not work due to student unfamiliarity with the devices

Mobile Devices	Number of devices
Blackberry Curve 8520	3
Blackberry Curve 9300	3
Nokia 5800	2
Nokia 6710	1
Sony Xperia	1

## Some CS4 devices displaying MOBILect:

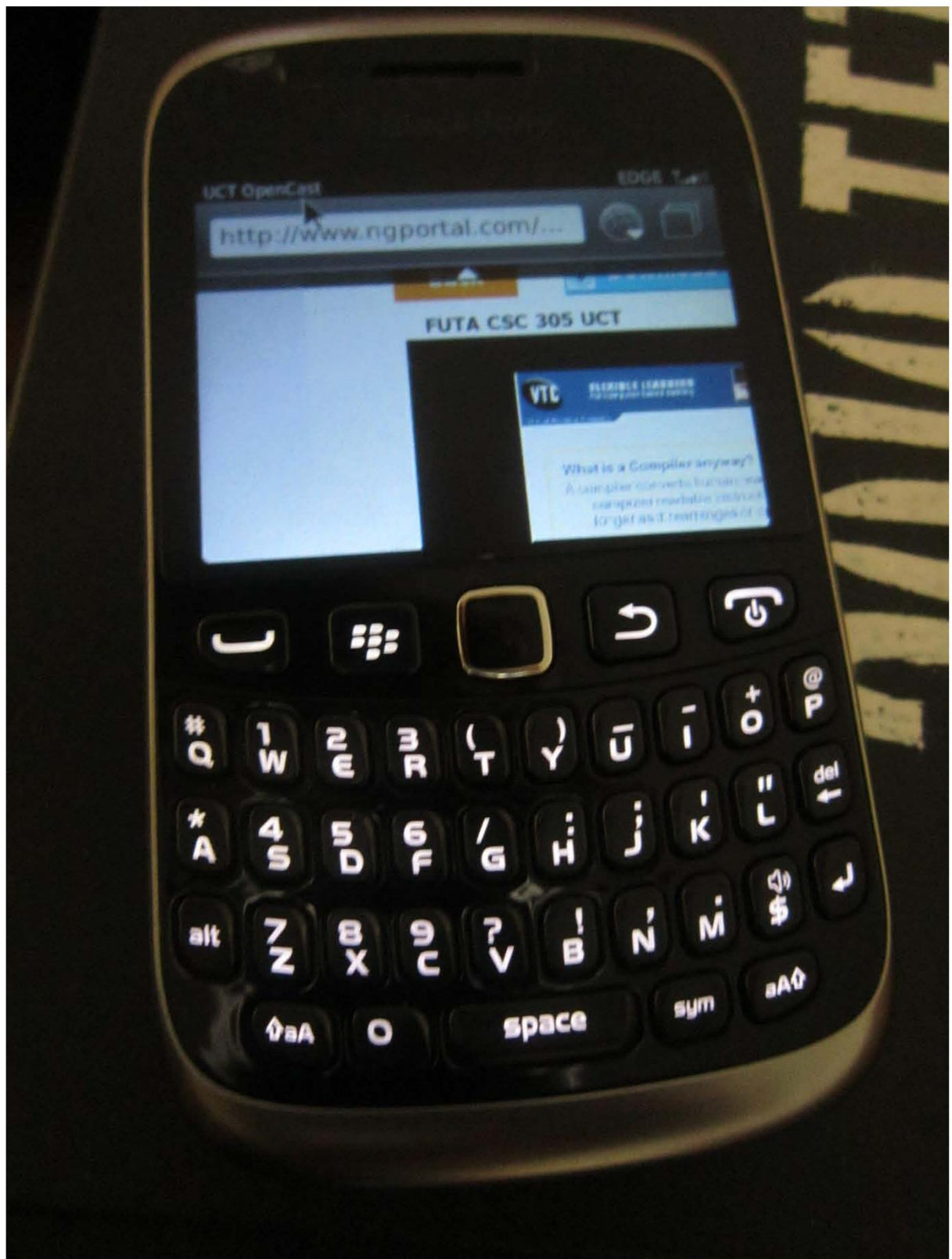


Blackberry 9930



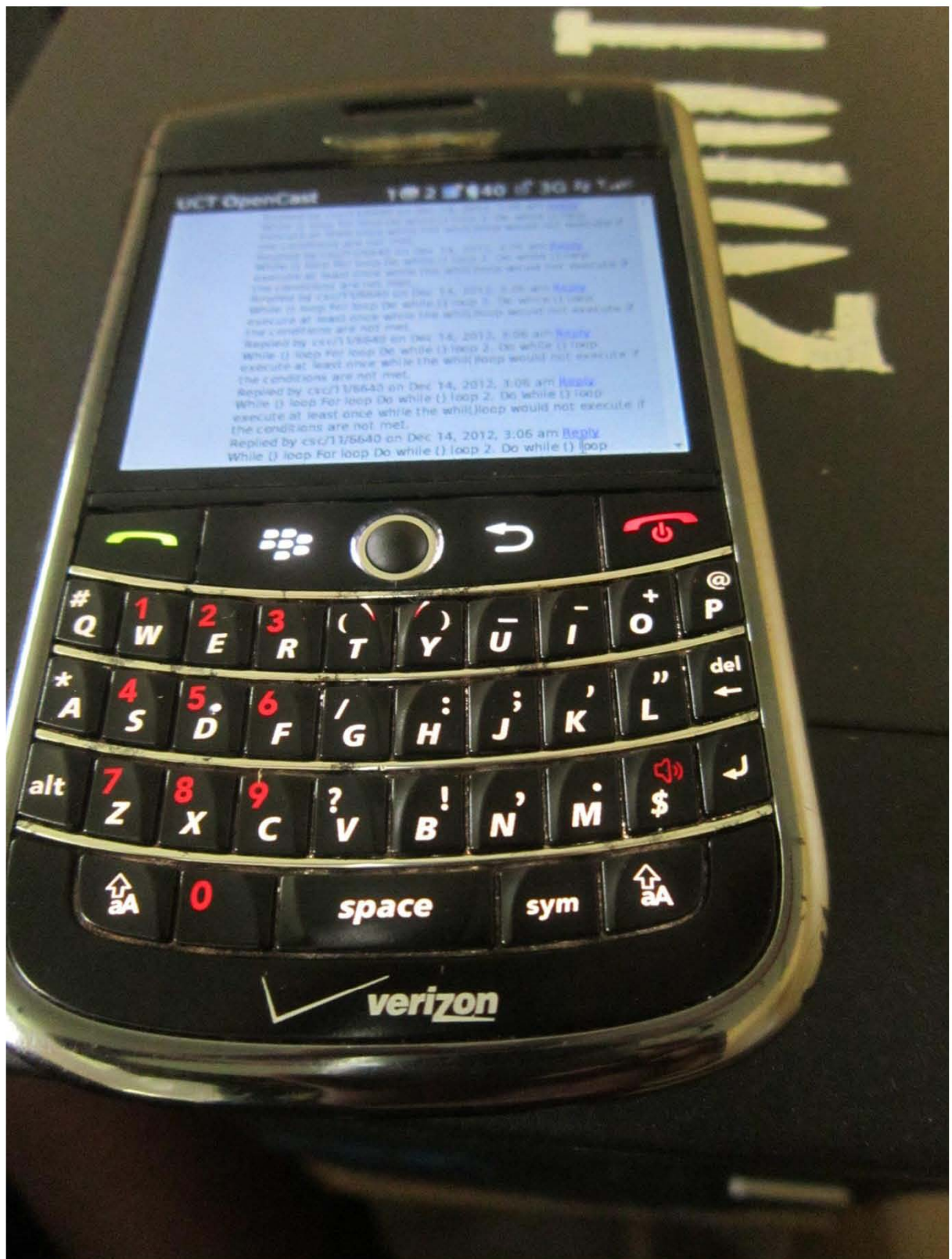
Blackberry 9900





Blackberry 9700



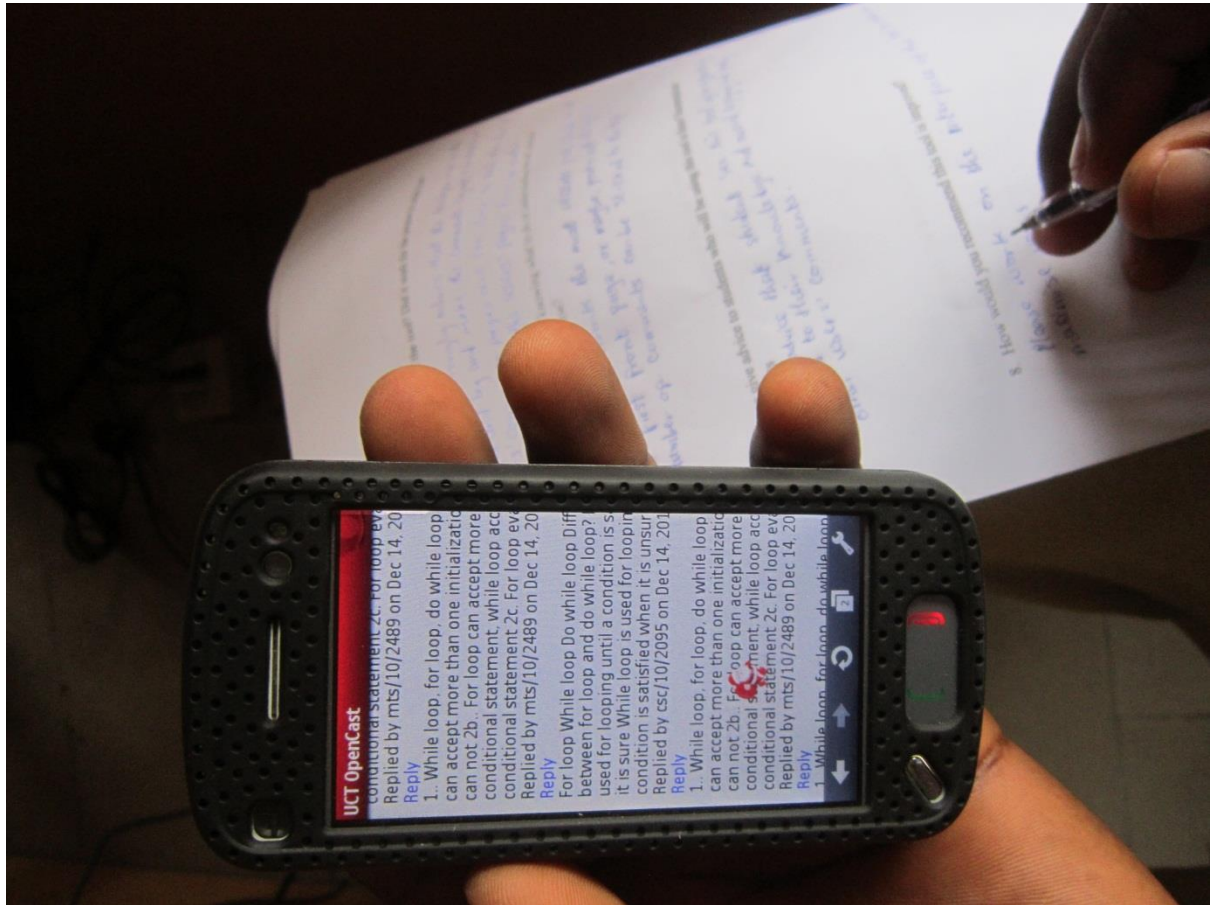


Blackberry 9650

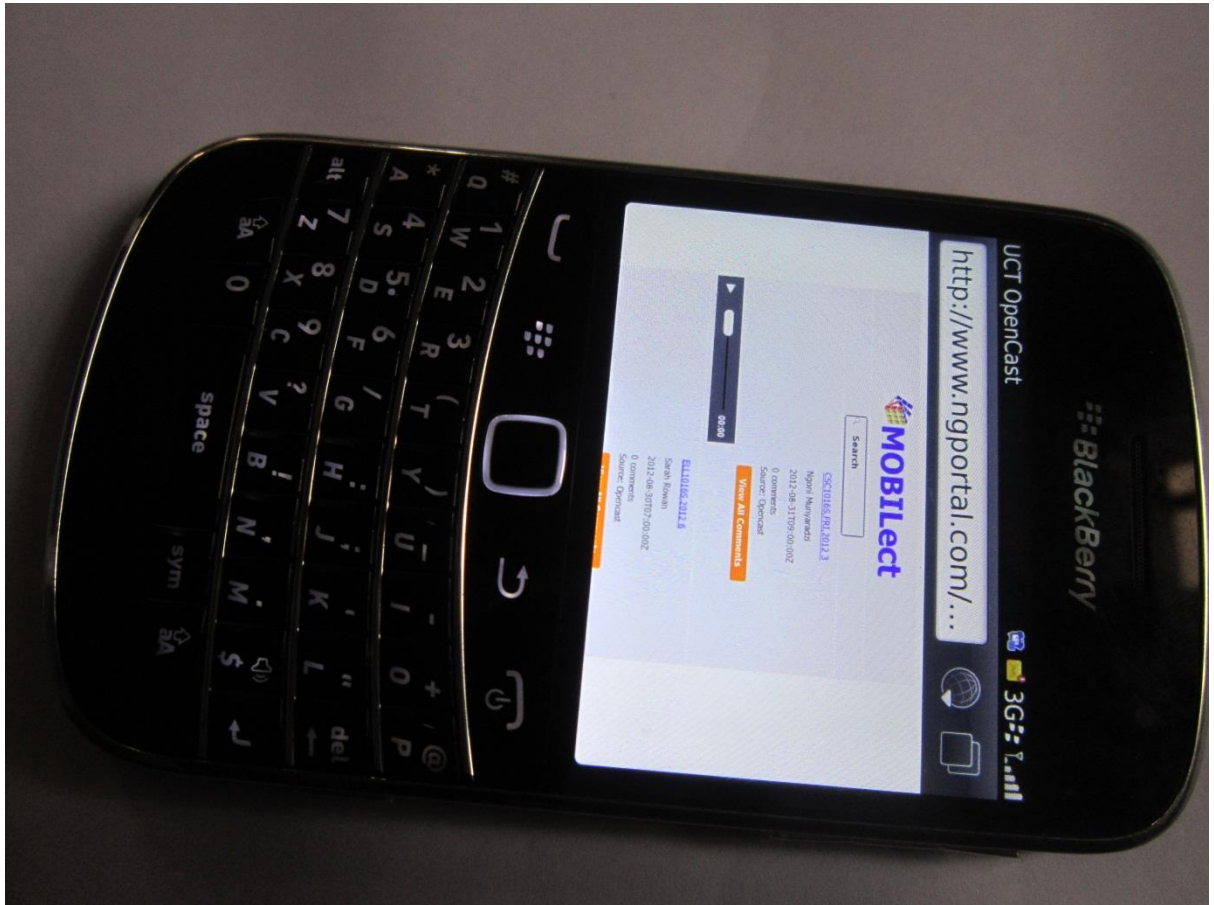


Blackberry 9800

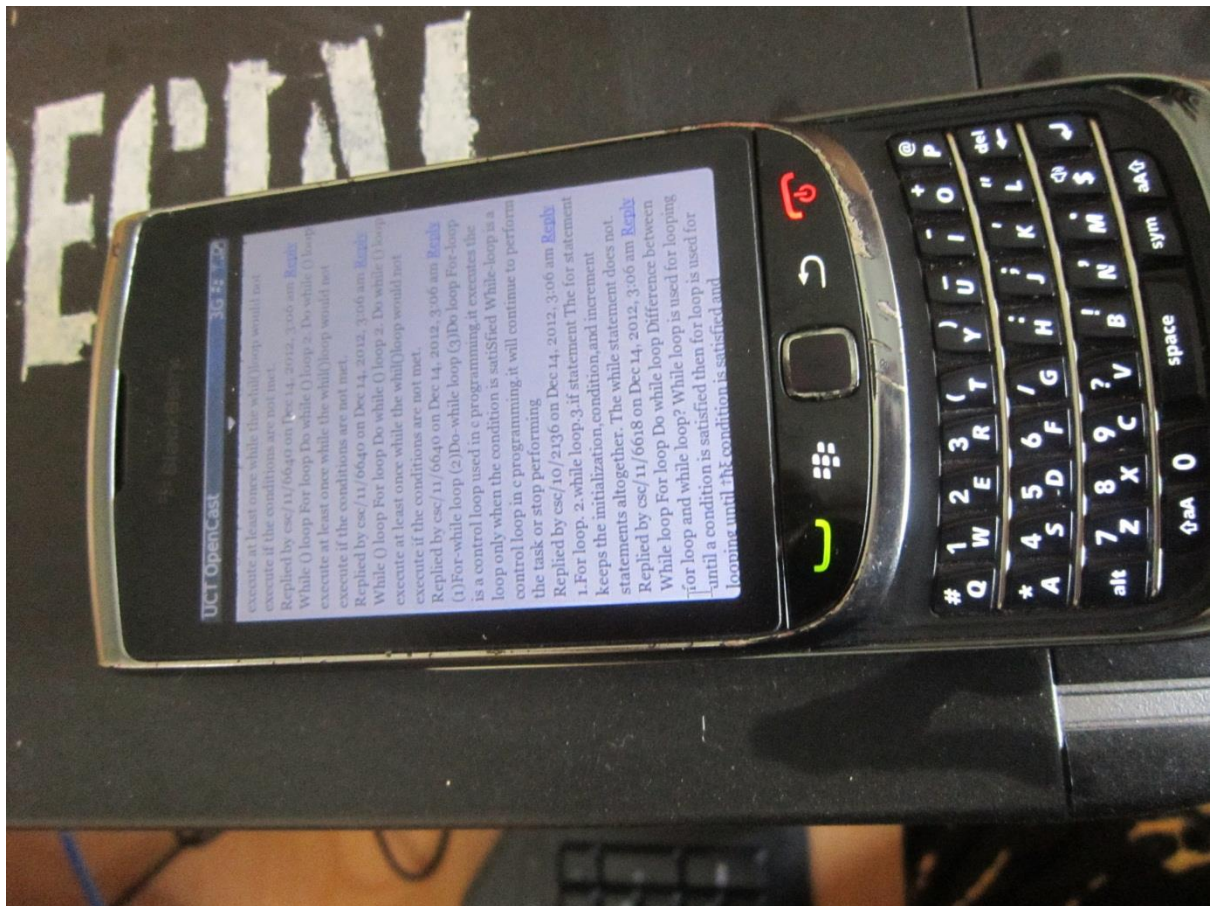




Sony Ericsson W995



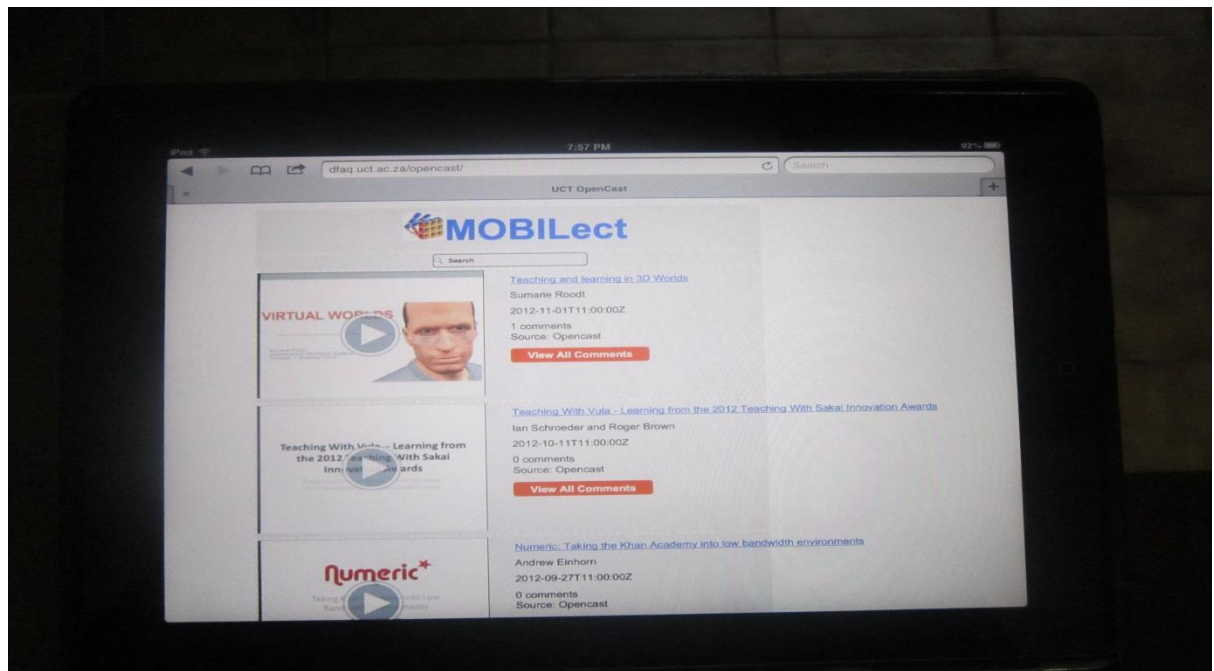
**Blackberry 9790**



**Blackberry 9800**

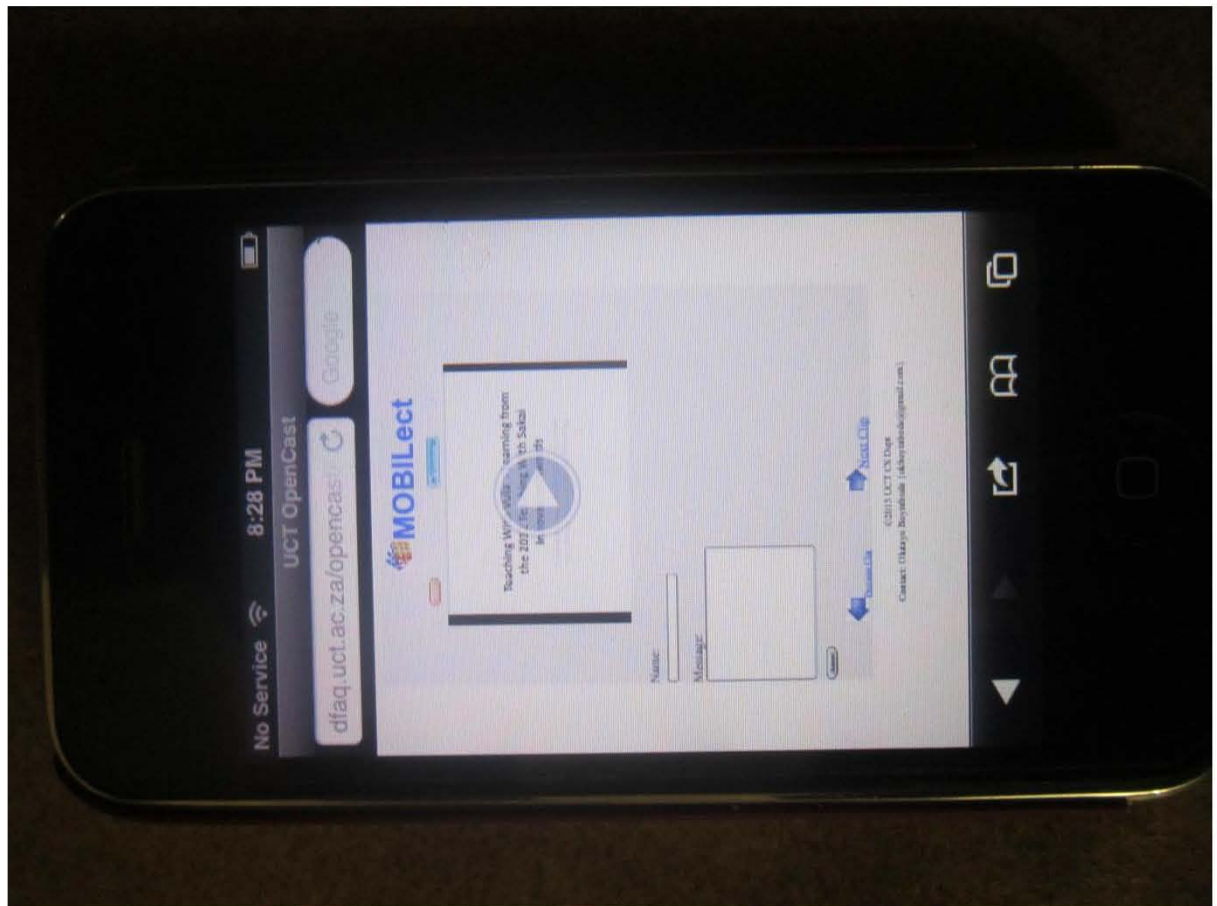
## APPENDIX L

### SOME DEVICES SHOWING DFAQ



iPad





iPhone 3G

## APPENDIX M

UC | OpenCast

2012/08/05 9:53 PM



Back

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### Algorithm to find the minimum in a list of numbers

1. If the list is empty, display an error message and go to step 8
2. Start at the beginning of the list
3. Set the current minimum to the first number in the list
4. If there are no more numbers, display the current minimum and go to step 8
5. Move on to the next number in the list
6. If the current number < current minimum, set the current minimum to the current number
7. Go to step 4
8. Stop

43 comments

Please answer the following questions: 1. What are the key points in this lecture? 2. What questions are being answered by the lecturer?

Posted by #Instructor on Apr 26, 2012, 6:23 am [Reply](#)

1. the 2 key points in the lecture are that u must make sure to program the best and most simplistic algorithm possible. The other key point is to set the min value to the current number for solving the problem. 2. The lecturer answers questions that th

Posted by Student#1 on Apr 26, 2012, 8:20 am [Reply](#)

Posted by Student#2 on Apr 26, 2012, 8:21 am [Reply](#)

The main points: Algorithms...how to create and then code them How 2 avoid errors or bugs Questions answered: Wt range to put in ur program fr any given situations

Posted by Student#4 on Apr 26, 2012, 8:24 am [Reply](#)

a) the lecture covers how 2 make an algorithm 2 find the min or max of a list of numbers. Key points are that the algorithm is not implemented in code just English. b) the lecturer answers questions from students about how the algorithm is implemented, a

Posted by Student #3 on Apr 26, 2012, 8:24 am [Reply](#)

1. the 2 key points in the lecture are that u must make sure to program the best and most simplistic algorithm possible. The other key point is to set the min value



to the current number for solving the problem. 2. The lecturer answers questions that thAt

Posted by Student#9 on Apr 26, 2012, 8:26 am [Reply](#)

1. Keep ur solutn genral, nd tht it dsnt cvr nly tht specific problem. Mke sure al factors r considrd. 2. Rsns y u cnt set exact points as a strting point.

Posted by Student #5 on Apr 26, 2012, 8:26 am [Reply](#)

The lecturer went over hw 2 write algorithm 4 finding a min of a list of no's. it was a basic loop algorithm with sum decision statements. She also stepped thru hw a comp thinks. She answered lots of q's - most abt hw 2 rite the algorithm nd gave sugges

Posted by Student #8 on Apr 26, 2012, 8:26 am [Reply](#)

1) Find max nd min of list of nos. figure out how 2 solve a problm using a algorithm inst ed of a progrm. 2) cn the comp understnd < signs? Yes. Franki askd sumthin... Cudn't hear his q. Cud hear otha q's being answerd bt cudn't hear the actual q's.

Posted by Student#6 on Apr 26, 2012, 8:26 am [Reply](#)

The key pts n that lecture r: thnk bowt th prob nd hw 2 solve t b4 u strt programming. Qs tht wr answerd: y cnt we set a min of 0?

Posted by Student#1 on Apr 26, 2012, 8:27 am [Reply](#)

E lecture z basically abt hw u cn cre8 n algorithm tht wl find the lowest numba in a given sequence of numbaz...e lecturer thn interacts nd addresses comments and questions by students B E lecturer cleared a few of the questions tho it bcoz of generally

Posted by Student#1 on Apr 26, 2012, 8:28 am [Reply](#)

Only one of the students ques waz clearly audible

Posted by Student#1 on Apr 26, 2012, 8:31 am [Reply](#)

A) implementing algorithms, finding a min n max. Asking ideas frm audiance. Doing algorithms 1 step at a tym. Hidden errors. Stepping through algorithms.

Posted by Student#7 on Apr 26, 2012, 8:31 am [Reply](#)

Reply @student#3 Yes she did make it clear that the algorithm could be in english ie pseudo code

Posted by Student#4 on Apr 26, 2012, 8:33 am [Reply](#)

Reply@student#5 I agree with what you have to say. She used stoecific decision statements. That being for while loops.

Posted by Student#9 on Apr 26, 2012, 8:33 am [Reply](#)

B) Y the algorithm shld b implemented in certain ways such as using srting, because it wld b tougher.

Posted by Student#7 on Apr 26, 2012, 8:33 am [Reply](#)

reply @Student#6: I agree that u cudnt hear mst q's. Also she wrote things on the board which weren't shown on the video.

Posted by Student #8 on Apr 26, 2012, 8:34 am [Reply](#)

reply @student#5 I agree with you that the solution should be general, and that an algorithm should be generalities solve any list of numbers

Posted by Student #3 on Apr 26, 2012, 8:34 am [Reply](#)

Posted by on Apr 26, 2012, 8:35 am [Reply](#)

Reply: @student 8 She also gave rsns why certain algrthms wld nt wrk nd hw



thy cld be made mre efficient.

Posted by Student #5 on Apr 26, 2012, 8:35 am [Reply](#)

reply @ student#8 I agree, mny of the comments were nt audible.

Posted by Student#7 on Apr 26, 2012, 8:37 am [Reply](#)

Reply@student#true,ther waz n instance wen u cud hear Mitch ask Franki 4 hz name.u cud clearly hear him say hz name bt hz comment/question waz barely audible and I iterated tht portion 2wice bt I stl cudn hear anythn,,",

Posted by Student#2 on Apr 26, 2012, 8:39 am [Reply](#)

Reply @student#9: ja, if the algorithms r 2 complicated u gna get bugs. She said that there was a blackout bcoz of a software bug.

Posted by Student #8 on Apr 26, 2012, 8:40 am [Reply](#)

Reply @Student#8 I found ur comment helpful, I cud nt put in2 words y she sed we cnt use 0 as a strting pt. thnk u for mentioning tht the pc undastands th < symbol the sme way we do. U hve helpd me undastand th lecture mor clrly.

Thnks

Posted by Student#1 on Apr 26, 2012, 8:40 am [Reply](#)

Reply@student#3 gud points. The lecturer also defined wat a loop nd decisin is

Posted by Student#6 on Apr 26, 2012, 8:41 am [Reply](#)

Reply @student#1. I agree. Tho I cudn't hear any of da q's.

Posted by on Apr 26, 2012, 8:42 am [Reply](#)

Reply @Student 2 You forgot to mention what type of decision statement she used and what answers she gave. She answered questions as how to answer the problem.

Posted by Student#9 on Apr 26, 2012, 8:43 am [Reply](#)

Reply@student5 Basically u summarizd nd addressd e core of e lecture..nd also,she avoided evrything related 2 evolution questions....lol,

Posted by on Apr 26, 2012, 8:43 am [Reply](#)

Reply @student8 yeah ure ryt sh did mentioned relational operators I'd missed that entirely

Posted by Student#4 on Apr 26, 2012, 8:44 am [Reply](#)

@student#5 I agree, all algorithms shld try to b kept simple, she illustrates this point in great detail during the lecture

Posted by Student#7 on Apr 26, 2012, 8:44 am [Reply](#)

Reply @student #8 I agree that it was difficult to here what the questions being asked were and that she should have repeated them, also it was annoying not to be able to see the chalk board

Posted by Student #3 on Apr 26, 2012, 8:44 am [Reply](#)

Reply: @ Student 6 I lso agree, some of wht ws sed by th studnts wasnt clear, bt u cud srta hear wht thy asked judgng by hr answr

Posted by Student #5 on Apr 26, 2012, 8:45 am [Reply](#)

Reply @Student#6 I agree that we cudnt hear the qs being askd which is a prob and also we cudnt c wat was bein wrtn on the bord and that threw me

Posted by Student#1 on Apr 26, 2012, 8:45 am [Reply](#)

Reply@student#1. actually I did hear a little tho it was difficult to understand the q's asked. They weren't very audible

Posted by Student#6 on Apr 26, 2012, 8:45 am [Reply](#)

Reply: @Student 8 Yeah it wld hve bn bettr 2 c th stuff wrtn on th board

Posted by Student #5 on Apr 26, 2012, 8:46 am [Reply](#)

Reply @Student#4: it's weird hw ppl were asking q's abt if a comp would no that  $2 < 3$ , wen nw we no nd it's obvious

Posted by Student #8 on Apr 26, 2012, 8:47 am [Reply](#)  
@student

Posted by on Apr 26, 2012, 8:47 am [Reply](#)

Th lecturer answd al th qstns tht wre askd

Posted by Student#5 on Apr 26, 2012, 8:49 am [Reply](#)

Th lecturer answd al th qstns tht wre askd

Posted by Student#5 on Apr 26, 2012, 8:49 am [Reply](#)

Th lecturer answd al th qstns tht wre askd

Posted by Student#5 on Apr 26, 2012, 8:49 am [Reply](#)

Posted by on Apr 26, 2012, 8:49 am [Reply](#)

Th lecturer answd al th qstns tht wre askd

Posted by Student#5 on Apr 26, 2012, 8:49 am [Reply](#)

Reply@student#3 Basically she caved ol nd gv n intro in2 hw 2 think in algorithm thn gave a semi basic intro 'if st8ments...and,she also addressed hw bugs cozd e power outage on eastern seaboard

Posted by on Apr 26, 2012, 8:51 am [Reply](#)

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Contact: Olutayo Boyinbode {okboyinbode@gmail.com}


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### View All Comments CSC1016S,2012 A6

38 comments

Questions 1. What are the key points in this lecture? 2. What are the features of Object-oriented programming?

Posted by Teacher on Aug 1, 2012, 5:40 am [Reply](#)

The key points point in this lecture was the definition of OPP.

Replied by Student #1 on Aug 1, 2012, 7:23 am [Reply](#)

The key features of oop are that it involves encapsulation and polymorphism along with many others

Replied by Student#1 on Aug 1, 2012, 7:23 am [Reply](#)

The lecturer went over the key points of object orientated programming, namely the major component OOP is based on, what an object consists of and main states an object can be in.

Replied by Student #2 on Aug 1, 2012, 7:23 am [Reply](#)

The key points of the lecture is understanding how Object Orientated Programming works, how classes are created/defined, how objects work and how they interact with methods.

Replied by Student #5 on Aug 1, 2012, 7:24 am [Reply](#)

The key point of this lecture was dicussing object oriented design. How to use it.

An example of how a card is an object with a state and behaviors.

Replied by Student#6 on Aug 1, 2012, 7:24 am [Reply](#)

The key features of OOP are: OO provides a new paradigm The main concepts of OOP are: Classes and objects Encapsulation Methods and messages Inheritance Polymorphism Multiple instances of an object can be created. Objects have two sections, state and

Replied by Student #2 on Aug 1, 2012, 7:24 am [Reply](#)

What are the key points in this lecture?-to learn how object orientation I objects work and how the whole classes are structured.

Replied by Student#7 on Aug 1, 2012, 7:24 am [Reply](#)

Some features of object orientated programming include having methods, inheritance and some programs can be polymorphic.

Replied by Student#6 on Aug 1, 2012, 7:26 am [Reply](#)

The features of OPP are classes and objects,messages and methods, inheritance and polymorphism

Replied by Student #1 on Aug 1, 2012, 7:26 am [Reply](#)

The key points of the lecture are that objects have fields and methods which determine what they are and how they act and that OOP is a l about classes, everything written is done so inside a Class.



Replied by Student#8 on Aug 1, 2012, 7:27 am [Reply](#)

The key features of OOP is the interaction between objects and methods and how this concept can be used to write programs.

Replied by student #5 on Aug 1, 2012, 7:27 am [Reply](#)

Classes, methods and objects were emphasized on throughout the lecture if I am correct! Pretty complexish stuff when heard at first

Replied by Student#4 on Aug 1, 2012, 7:28 am [Reply](#)

Key points is to be able to use mobile application to learn with your phone. Replied by Students#7 on Aug 1, 2012, 7:29 am [Reply](#)

Can you explain the concept of polymorphism? I didn't really understand

Replied by Student #1 on Aug 1, 2012, 7:31 am [Reply](#)

@student#5 This is a very easy to understand description of the key points of the lecture.

Replied by Student #2 on Aug 1, 2012, 7:32 am [Reply](#)

@student#1. I am having difficulty understanding encapsulation could you help me by providing a short explanation, or an example?

Replied by Student#6 on Aug 1, 2012, 7:32 am [Reply](#)

Did you honestly learn a lot from this lecture? I didn't hear much. All I did was take down notes. Lol

Replied by Student#4 on Aug 1, 2012, 7:33 am [Reply](#)

The features of object oriented programming is that it allows for objects to be created.

These objects form a template upon which they can be modified and customized for variation. Object characteristics are that they have states and behaviours.

Replied by Student#8 on Aug 1, 2012, 7:34 am [Reply](#)

@student#1. Cool story bro.

Replied by student#5 on Aug 1, 2012, 7:35 am [Reply](#)

Ja hey, I heard the same thing.

Replied by Student#4 on Aug 1, 2012, 7:35 am [Reply](#)

@student#4 the Classes, methods, encapsulation stuff can be really complex stuff but it becomes easy over time especially if someone creates an analogy and dumbs it down from the complex words. You will get used to it.

Replied by Student #2 on Aug 1, 2012, 7:35 am [Reply](#)

At student 1, I agree but you could have said more like how it works or the way the code is structured.

Replied by Student#7 on Aug 1, 2012, 7:36 am [Reply](#)

@student#7. All of this seems unnecessary. Python is still an option, no complicated concepts there.

Replied by student#5 on Aug 1, 2012, 7:38 am [Reply](#)

@student#7 The lecture was a brief introduction to OOP, the key points were about the object oriented programming

Replied by Student#3 on Aug 1, 2012, 7:39 am [Reply](#)

@student#2 gee that totally makes me feel better. Your awesome dude

Replied by Student#4 on Aug 1, 2012, 7:40 am [Reply](#)

@Student#5 Indeed that is what makes java so unique and dynamic

Replied by Student#8 on Aug 1, 2012, 7:40 am [Reply](#)

At

@student#5 your funny

Replied by Student#5 on Aug 1, 2012, 7:42 am [Reply](#)

When you create an Class (AKA. Object) it has certain characteristics and it does certain actions (AKA Methods). Both of these characteristics together are "encapsulated" into a Class. Hence the term encapsulation.

Replied by Student #2 on Aug 1, 2012, 7:42 am [Reply](#)

@student#1 Polymorphism is when methods can have the same names but can be changed in different classes. I think.

Replied by Student#3 on Aug 1, 2012, 7:42 am [Reply](#)

@student #8 what do u mean by state?

Replied by Student #8 on Aug 1, 2012, 7:43 am [Reply](#)

@Student#2 The language is also used by 6 million different devices

Replied by Student#8 on Aug 1, 2012, 7:43 am [Reply](#)

@student#5 I see what you did there.

Replied by Student#3 on Aug 1, 2012, 7:45 am [Reply](#)

@student #1 encapsulation means hiding your values or methods so that they can not be accessed or modified from the calling module

Replied by Student#1 on Aug 1, 2012, 7:46 am [Reply](#)

The main points of OOP are Method and classes Inheritance and Polymorphism

Posted by Student#3 on Aug 1, 2012, 7:29 am [Reply](#)

@student #7 can you explain what polymorphism is?

Replied by Student #1 on Aug 1, 2012, 7:34 am [Reply](#)

# APPENDIX O

7/16/12

UCT OpenCast



Back

Down

load

View All Comments UCT  
while

11 comments

You are required to go through the following lecture and post your comment to answer the following question. 1. What is the problem that this lesson is trying to solve. 2. After other students also post their comments, read through these comments and po

Posted by Teacher on Jul 3, 2012, 5:56 am [Reply](#)

this lesson helped me so much. i have learnt how to use a "while" loop to build programs. the teacher was very clear on the syntax.

Replied by student3 on Jul 10, 2012, 6:36 am [Reply](#)

great lesson, knowing the right control structure to use will shorten the amount of code.

Replied by student4 on Jul 10, 2012, 6:43 am

[Reply](#) true that, fewer code, lots of capabilities

Replied by student3 on Jul 10, 2012, 8:52 am [Reply](#)

(Teacher) @ student1 There is a semantic difference between the two.

While loops, in general, are meant to have an indefinite number of iterations and for loops should have a more definite number of iterations. @student4 you had the idea

Replied by Teacher on Jul 11, 2012, 5:13 am [Reply](#)

Thank you so much for the lesson. I really understood the concept of the while loop.

Posted by student1 on Jul 10, 2012, 9:28 am [Reply](#)

So which one is the best loop to use between the two or under what circumstances can I use the while loop?

Posted by student1 on Jul 10, 2012, 9:31 am [Reply](#)

@student1 something like one is for count controlled and the other when you don't know the number of iterations.

Replied by student4 on Jul 11, 2012, 5:10 am [Reply](#)

Hi all, your feedback shows that some have been able to grasp the concepts. From the example given, try to write a program that prints that

Can you write a program similar to the example given but printing the numbers in reverse order

Posted by Teacher on Jul 16, 2012, 4:08 am [Reply](#)

The lesson makes it clear how a while loop is used comparing it with the if statement.

Posted by Student 2 on Jul 16, 2012, 4:36 am [Reply](#)

I can see that this platform enhances learning and helps others who do not always contribute on face to face to also contribute. the comments helped other students focus more on the most important concepts.

Posted by Teacher on Jul 16, 2012, 6:38 am [Reply](#)

I have not been posting comments on the platform but I have constantly viewed other people's comments and this has helped me much.

Posted by Student5 on Jul 16, 2012, 6:58 am [Reply](#)



## APPENDIX P

12/14/12



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248 comments

Question 1 Describe three control loops in C programming Question 2

Differentiate between for and while loop

Posted by Teacher on Dec 13, 2012, 1:48 pm [Reply](#)

1.for loop and while loop 2.for loop initialize variable, while loop doesn't initialize variable, while loop doesn't increment and decrement, While loop doesn't increment and decrement

Replied by linus godshonour mts/10/2529 on Dec 14, 2012, 2:55 am [Reply](#)

1.for loop and while loop 2.for loop initialize variable, while loop doesn't initialize variable, while loop doesn't increment and decrement, While loop doesn't increment and decrement

Replied by linus godshonour mts/10/2529 on Dec 14, 2012, 2:56 am [Reply](#)

While loop, do while loop, for loop. For loop uses different structures in it like initialization, condition and statement, while while loop uses only conditions and then statements.

Replied by mts/10/2485 on Dec 14, 2012, 2:57 am [Reply](#)

While () loop For loop Do while() loop

Replied by csc/10/2073 on Dec 14, 2012, 2:59 am [Reply](#)

1) While() loop 2) for loop 3) do while() loop b) for loop works in the format

for(initialization; conditional statement; increment/decrement){ statement 1

statement n } while loop works in the format while(conditional statement){

statement 1; statement n; } Contact: Olutayo Boyinbo {okboyinbo@gmail.com}

Replied by Ajipatutu Olufemi MTS/10/2495 on Dec 14, 2012, 3:01 am [Reply](#)

1. The 3 control loops in C programming are: \*While Loop: While

(conditional\_statement){ Statement; ; Statement; } \*For Loop: For

(initialization;); Statement 1; ; Statement 2; } \*Do While loop: Do while

Replied by csc/10/2081 on Dec 14, 2012, 3:01 am [Reply](#)

1. While loop For loop Do loop 2. while loop - used for looping until a

condition is satisfied and when it is unsure how many times the code should be in loop for loop - used for looping until a condition is satisfied but it is used

when you know how many

Replied by csc/11/6600 on Dec 14, 2012, 3:05 am [Reply](#)

While () loop For loop Do while () loop 2. Do while () loop execute at least

once while the while() loop would not execute if the conditions are not met.

Replied by csc/11/6640 on Dec 14, 2012, 3:05 am [Reply](#) While () loop For

Replied by csc/11/6640 on Dec 14, 2012, 3:05 am [Reply](#)

While () loop For loop Do while () loop 2. Do while () loop execute at least once while the while()loop would not execute if the conditions are not met.

Replied by csc/11/6640 on Dec 14, 2012, 3:05 am [Reply](#)

While () loop For loop Do while () loop 2. Do while () loop execute at least once while the while()loop would not execute if the conditions are not met.

Replied by csc/11/6640 on Dec 14, 2012, 3:05 am [Reply](#)

While () loop For loop Do while () loop 2. Do while () loop execute at least once while the while()loop would not execute if the conditions are not met.

Replied by csc/11/6640 on Dec 14, 2012, 3:05 am [Reply](#)

While () loop For loop Do while () loop 2. Do while () loop execute at least once while the while()loop would not execute if the conditions are not met.

Replied by csc/11/6640 on Dec 14, 2012, 3:06 am [Reply](#)

While () loop For loop Do while () loop 2. Do while () loop execute at least once while the while()loop would not execute if the conditions are not met.

Replied by csc/11/6640 on Dec 14, 2012, 3:06 am [Reply](#)

While () loop For loop Do while () loop 2. Do while () loop execute at least once while the while()loop would not execute if the conditions are not met.

Replied by csc/11/6640 on Dec 14, 2012, 3:06 am [Reply](#)

While () loop For loop Do while () loop 2. Do while () loop execute at least once while the while()loop would not execute if the conditions are not met.

Replied by csc/11/6640 on Dec 14, 2012, 3:06 am [Reply](#)

While () loop For loop Do while () loop 2. Do while () loop execute at least once while the while()loop would not execute if the conditions are not met.

Replied by csc/11/6640 on Dec 14, 2012, 3:06 am [Reply](#)

While () loop For loop Do while () loop 2. Do while () loop execute at least once while the while()loop would not execute if the conditions are not met.

Replied by csc/11/6640 on Dec 14, 2012, 3:06 am [Reply](#)

While () loop For loop Do while () loop 2. Do while () loop execute at least once while the while()loop would not execute if the conditions are not met.

Replied by csc/11/6640 on Dec 14, 2012, 3:06 am [Reply](#)

While () loop For loop Do while () loop 2. Do while () loop execute at least once while the while()loop would not execute if the conditions are not met.

Replied by csc/11/6640 on Dec 14, 2012, 3:06 am [Reply](#)

(1)For-while loop (2)Do-while loop (3)Do loop For-loop is a control loop used in c programming.it executes the loop only when the condition is satisfied While-loop is a control loop in c programming.it will continue to perform the task or stop performing

Replied by csc/10/2136 on Dec 14, 2012, 3:06 am [Reply](#)

1.For loop. 2.while loop.3.if statement The for statement keeps the initialization,condition,and increment statements altogether. The while statement does not.

Replied by csc/11/6618 on Dec 14, 2012, 3:06 am [Reply](#)

While loop For loop Do while loop Difference between for loop and while loop? While loop is used for looping until a condition is satisfied then for loop is used for looping until the condition is satisfied and initializing,conditioning,increment a

Replied by csc/10/2098 on Dec 14, 2012, 3:07 am [Reply](#)

Question 2: The for loop is used to iterate a program given a boundary (ie with two conditions maybe  $\geq a$  or  $\leq$ ). On the other hand, the while loop is used to iter

Replied by Ayodeji Oluwatosin Abiodun csc/10/2076 on Dec 14, 2012, 3:11 am [Reply](#)

We have 1 do loop .2. for loop .3. while loop .2. for For loop statement we have for(initialization, condition statement increment/decrement){ statement; statement2 } for while loop statement we have while(conditional statement){ statement 1; stateme

Replied by Mts/10/2537 on Dec 14, 2012, 3:12 am [Reply](#)

1 a. While loop (b) for loop. (c) do while loop. 2a. For loop can accept more than one initialization.

Replied by Mts/10/2553 on Dec 14, 2012, 3:12 am [Reply](#)

Do while() loop execute at least one time while thl while () loop wi l only execute if the conditional statement are met.

Replied by csc/10/2073 on Dec 14, 2012, 3:12 am [Reply](#)

Do while() loop execute at least one time while thl while () loop wi l only execute if the conditional statement are met.

Replied by csc/10/2073 on Dec 14, 2012, 3:12 am [Reply](#)

Do while() loop execute at least one time while thl while () loop wi l only execute if the conditional statement are met.

Replied by csc/10/2073 on Dec 14, 2012, 3:13 am [Reply](#)

Do while() loop execute at least one time while thl while () loop wi l only execute if the conditional statement are met.

Replied by csc/10/2073 on Dec 14, 2012, 3:14 am [Reply](#)

1.. While loop, for loop, do while loop 2a. For loop can accept more than one initialization: while loop can not 2b.. For loop can accept more than one conditional statement, while loop accept only one conditional statement 2c. For loop evaluate the test

Replied by mts/10/2489 on Dec 14, 2012, 3:14 am [Reply](#)

1. While loop, for loop, do while loop 2. While loop is used for looping until a condition is satisfied and even it is unsure how many times the code should be in loop. For loop is used for loop in until a condition is satisfied but when it is sure how many t

Replied by mts/10/2505 on Dec 14, 2012, 3:14 am [Reply](#)

1.. While loop, for loop, do while loop 2a. For loop can accept more than one initialization: while loop can not 2b.. For loop can accept more than one conditional statement, while loop accept only one conditional statement 2c. For loop evaluate the test

Replied by mts/10/2489 on Dec 14, 2012, 3:15 am [Reply](#)

1. FOR LOOP (for loop is a type of loop that initialise variable and also increment variable). WHILE LOOP and DO WHILE LOOP. 2. (1. FOR LOOP initialise variable but WHILE LOOP does not initialise variable.). (2. FOR LOOP can increment and decrement but WHIL

Replied by Csc/10/2036 on Dec 14, 2012, 3:15 am [Reply](#)

(1). While loop, do while loop, for loop. (2). For loop uses different structures in it like initialization, condition and statement, while while loop uses only conditi

1.. While loop, for loop, do while loop 2a. For loop can accept more than one initialization: while loop can not 2b.. For loop can accept more than one conditional statement, while loop accept only one conditional statement 2c. For loop evaluate the test

Replied by mts/10/2489 on Dec 14, 2012, 3:16 am [Reply](#)

1.. While loop, for loop, do while loop 2a. For loop can accept more than one initialization: while loop can not 2b.. For loop can accept more than one conditional statement, while loop accept only one conditional statement 2c. For loop evaluate the test

Replied by mts/10/2489 on Dec 14, 2012, 3:16 am [Reply](#)

1.. While loop, for loop, do while loop 2a. For loop can accept more than one initialization: while loop can not 2b.. For loop can accept more than one conditional statement, while loop accept only one conditional statement 2c. For loop evaluate the test

Replied by mts/10/2489 on Dec 14, 2012, 3:16 am [Reply](#)

For loop While loop Do while loop Difference between for loop and do while loop? For loop is used for looping until a condition is satisfied when it is sure While loop is used for looping until a condition is satisfied when it is unsure

Replied by csc/10/2095 on Dec 14, 2012, 3:16 am [Reply](#)

1.. While loop, for loop, do while loop 2a. For loop can accept more than one initialization: while loop can not 2b.. For loop can accept more than one conditional statement, while loop accept only one conditional statement 2c. For loop evaluate the test

Replied by mts/10/2489 on Dec 14, 2012, 3:16 am [Reply](#)

1.. While loop, for loop, do while loop 2a. For loop can accept more than one initialization: while loop can not 2b.. For loop can accept more than one conditional statement, while loop accept only one conditional statement 2c. For loop evaluate the test

Replied by mts/10/2489 on Dec 14, 2012, 3:16 am [Reply](#)

1.. While loop, for loop, do while loop 2a. For loop can accept more than one initialization: while loop can not 2b.. For loop can accept more than one conditional statement, while loop accept only one conditional statement 2c. For loop evaluate the test

Replied by mts/10/2489 on Dec 14, 2012, 3:16 am [Reply](#)

1.. While loop, for loop, do while loop 2a. For loop can accept more than one initialization: while loop can not 2b.. For loop can accept more than one conditional statement, while loop accept only one conditional statement 2c. For loop evaluate the test

Replied by mts/10/2489 on Dec 14, 2012, 3:16 am [Reply](#)

1.. While loop, for loop, do while loop 2a. For loop can accept more than one initialization: while loop can not 2b.. For loop can accept more than one conditional statement, while loop accept only one conditional statement 2c. For loop evaluate the test

Replied by mts/10/2489 on Dec 14, 2012, 3:16 am [Reply](#)

1.. While loop, for loop, do while loop 2a. For loop can accept more than one initialization: while loop can not 2b.. For loop can accept more than one conditional statement, while loop accept only one conditional statement 2c. For 1

1.. While loop, for loop, do while loop 2a. For loop can accept more than one initialization: while loop can not 2b.. For loop can accept more than one conditional statement, while loop accept only one conditional statement 2c. For loop evaluate the test

Replied by mts/10/2489 on Dec 14, 2012, 3:17 am [Reply](#)

1. While ( ) loop Do while ( ) loop For loop. 2. Do while ( ) loop implement or execute at least once. While the while ( ) loop will only execute if the conditional statement is true.

Replied by mts/10/2506 on Dec 14, 2012, 3:19 am [Reply](#)

Types of control loop structures includes; while()loop, for loop and do while()loop. The difference between the while() and for loop is that the for loop you must use the -initialization;conditional statement;increment/decrement

Replied by csc/10/2029 on Dec 14, 2012, 3:19 am [Reply](#)

Types of control loop structures includes; while()loop, for loop and do while()loop. The difference between the while() and for loop is that the for loop you must use the -initialization;conditional statement;increment/decrement

Replied by csc/10/2029 on Dec 14, 2012, 3:19 am [Reply](#)

Types of control loop structures includes; while()loop, for loop and do while()loop. The difference between the while() and for loop is that the for loop you must use the -initialization;conditional statement;increment/decrement

Replied by csc/10/2029 on Dec 14, 2012, 3:19 am [Reply](#)

Types of control loop structures includes; while()loop, for loop and do while()loop. The difference between the while() and for loop is that the for loop you must use the -initialization;conditional statement;increment/decrement

Replied by csc/10/2029 on Dec 14, 2012, 3:19 am [Reply](#)

Types of control loop structures includes; while()loop, for loop and do while()loop. The difference between the while() and for loop is that the for loop uses initialization;conditional statement;increment/decrement for declaring the variables while the w

Replied by sta/10/2501 on Dec 14, 2012, 3:19 am [Reply](#)

1. The three control loops are the FOR loop, DO WHILE and DO loop. 2. Difference between the FOR loop and the WHILE LOOP: in the while loop, the statement will be executed at least once while the FOR loop, it might not be executed at all if the condition

Replied by csc/10/2063 on Dec 14, 2012, 3:21 am [Reply](#)

For loop, while loop, do while loop 2a. For loop initialize variables and while loop doesn't 2b. For loop increment and decrement and while loop does not

Replied by mts /10/2528 on Dec 14, 2012, 3:21 am [Reply](#)

1. (a) for loop (b)do while ( )loop (c) while ( ) loop 2. The difference between 'for loop' and 'while loop' is that the syntax of the while loop does not require any initialization i.e while(condition){ statement1; statement2; }. But in fo

Replied by csc/10/2124 on Dec 14, 2012, 3:21 am [Reply](#)

Control loops. In c programming are do while loop,for loop and while loopthe do while loop is normally used when there is need for iteration and it must be more than once.the for loop is for loop is used when there is need for initialization,increment or

Replied by csc/10/2044 on Dec 14, 2012, 3:21 am [Reply](#)



given that a condition is met. For() loop allows the initialisation of a counter variable, a ch

Replied by Mts/10/2507 on Dec 14, 2012, 3:23 am [Reply](#)

1. We have the for loop, while loop and do while loop 2. The major difference between for loop and do loop is that the for loop is using iteration method while the do loop does not

Replied by CSC/10/2027 on Dec 14, 2012, 3:24 am [Reply](#)

1. We have the I. for-loop Has it's constructs like this: For(index\_start; index\_end; iteration) { Program Statement(s)..... } II. While-loop Has it's construct as this: While (condition) { Program Statement(s)....

Replied by CSC/10/2129 on Dec 14, 2012, 3:24 am [Reply](#)

1. (i) While loop, (i) For loop and (i) Do while loop. 2. (i) while loop contains only d conditional statement in its structure while For loop contains conditional statement, increment, initialization and so on in its syntax.

Replied by Saidat CSC/10/2024 on Dec 14, 2012, 3:24 am [Reply](#)

The three control structure - WHILE() LOOP - FOR LOOP - DO WHILE() LOOP WHILE LOOP While(conditional statement) { Statement 1; ::

Statement 2; } FOR LOOP For(initialization, conditional\_statement, inc

Replied by csc/10/2092 on Dec 14, 2012, 3:24 am [Reply](#)

1. For loop, while loop, do while loop 2a. For loop initialize variables and while loop does not 2b. For loop accept more than one conditional statements and while loop accepts only one conditional statement.

Replied by mts/10/2478 on Dec 14, 2012, 3:25 am [Reply](#)

Three control loops are: (1) while loop (2) fore-loop (3) do -while- loop.

Replied by Mts/10/2567 on Dec 14, 2012, 3:26 am [Reply](#)

1.. While loop, do while loop, for loop 2a.. For loop increment and decrement and while loop does not 2b.. For loop initialize variables and while loop does not initialize variable.

Replied by mts/11/7033 on Dec 14, 2012, 3:26 am [Reply](#)

1. While () loop Do while () loop For loop 2. Do while () loop would execute at least once whether or not the statement(condition) is true while the while () loop would only execute upon a true conditional statement.

Replied by csc/10/2094 on Dec 14, 2012, 3:27 am [Reply](#)

We have the for loop, the while loop and the do-while loop. the for loop contains initialisation statement, the conditional statement and increment/decrement. the while loop contains jst the conditional statement. eg while(i<=n)

Replied by CSC/10/2126 on Dec 14, 2012, 3:28 am [Reply](#)

Question 1 The three loops are 1) For loop 2) While loop 3) Do while loop For loop: (initialization, conditional statement, increment/decrement) 2) While (Conditional statement) 3) Do while Loop (Conditional Statement) Answer to Quest

Replied by Mts/10/2511 on Dec 14, 2012, 3:29 am [Reply](#)

1. For loop, while loop, do while loop 2a. For loop initialize variables and while loop does not initialize variable 2b.. For loop accepts more than one conditional statements and while loop accepts only one conditional statements.

Replied by mts/10/2556 on Dec 14, 2012, 3:29 am [Reply](#)

1). a) While Loop: This Loop processes conditional statements. b) For Loop:

conditional WHILE- Statement

Replied by MTS/10/2552 on Dec 14, 2012, 3:30 am [Reply](#)

1. for() loop 2. while loop 3. do while () loop 1. For loop can be used for initialisation. 2. For loop is also used in control statement. 3. for loop is used for increment and decrement. while loop 1. while loop does not initialize

Replied by mts/10/2483 on Dec 14, 2012, 3:31 am [Reply](#)

1 CONTROL LOOP STRUCTURE TYPES 1. While loop 2. For loop 3. Do while loop while(expression) statement; for( initializing, conditioning, increment ) 2. Difference between for loop and while loop? WHILE loop is used for looping until a condition is sat

Replied by on Dec 14, 2012, 3:31 am [Reply](#)

1. A. for loop B. while loop C. do while loop 2. The difference between for and while loop is in the structure For loop For(initialization, conditional statement, increment, decrement){ Statement; : Statement; } The

Replied by csc/11/6670 on Dec 14, 2012, 3:32 am [Reply](#)

The three control loops are for loop, while() loop, do while() loop. the difference between the while and for loop is that the for loop you must initialize; conditional statement; increment/decrement.

Replied by sta/10/2536 on Dec 14, 2012, 3:32 am [Reply](#)

1. The different loops in C are \*FOR loop(initialization;); Statement 1; : Statement 2; ; \*do while loop: do while and \*while loop(conditional\_statement){ Statement; : Statement; } 2. Differences between for loop and while loop A. for loop is counted and

Replied by (csc/10/2153) on Dec 14, 2012, 3:32 am [Reply](#)

1. The 3 loops are : For loop, while loop, do while loop For loop structure: for (initialization;); Statement 1; : Statement 2; } While loop structure: while (conditional\_statement){ Statement; : Statement; } 2a) For loop is counted, while loop is not counted

Replied by CSC/10/2137 on Dec 14, 2012, 3:32 am [Reply](#)

The three control loops are for loop, while() loop, do while() loop. the difference between the while and for loop is that the for loop you must initialize; conditional statement; increment/decrement.

Replied by csc/10/2112 on Dec 14, 2012, 3:32 am [Reply](#)

1. While loop For loop Do loop 2. While loop is used to loop until a condition is satisfied and when it is not certain how many times the code should be in loop while For loop is also used to loop until a condition is satisfied and when it is certain

Replied by csc/10/2042 on Dec 14, 2012, 3:32 am [Reply](#)

1. For loop. Do while loop. While loop 2. While loop, it is used for looping until a condition is satisfied and when it is unsure how many times the code should be in loop. For loop, it is used for looping until

Replied by csc/10/2084 on Dec 14, 2012, 3:33 am [Reply](#)

The three control loops are for loop, while() loop, do while() loop. the difference between the while and for loop is that the for loop you must initialize; conditional statement; increment/decrement.

Replied by csc/10/2154 on Dec 14, 2012, 3:33 am [Reply](#)

The three control loops are for loop, while() loop, do while() loop. the difference

Replied by csc/10/2154 on Dec 14, 2012, 3:33 am [Reply](#)

Q1: for loop while () loop do while() loop Q2: for loop increment and decrement for(initialization;conditional statement increment/decrement){ statement1; statement2; } while loop does not increment and decrement while(condition

Replied by csc/11/6634 on Dec 14, 2012, 3:33 am [Reply](#)

1. For loop 2.do while loop i.e do while(i < n; i );{ statement; } return o; 3.while loop question 2 \* For loop i.e for(initialisation;conditional statement;inc/decrement) {statement 1; to statement n;} return o; \* While loop i.e

Replied by CSC/10/2078 on Dec 14, 2012, 3:34 am [Reply](#)

1. For loop, while loop, do while loop 2a. For loop initialize variables and while loop does not initialize variable 2b.. For loop accepts more than one conditional statements and while loop accepts only one conditional statements.

Replied by mts/10/2554 on Dec 14, 2012, 3:35 am [Reply](#)

1. For loop, while loop, do while loop 2a. For loop initialize variables and while loop does not initialize variable 2b.. For loop accepts more than one conditional statements and while loop accepts only one conditional statements.

Replied by mts/10/2490 on Dec 14, 2012, 3:35 am [Reply](#)

1. For loop 2.do while loop i.e do while(i < n; i );{ statement; } return o; 3.while loop question 2 \* For loop i.e for(initialisation;conditional statement;inc/decrement) {statement 1; to statement n;} return o; \* While loop i.e

Replied by CSC/10/2078 on Dec 14, 2012, 3:36 am [Reply](#)

For, while loop and do while loop. For loop is use for incrementing and decrementing, do while loop is used for conditional statement, while loop is used to control structure eg to do smthing if certain condition is met

Replied by MTS/10/2557 on Dec 14, 2012, 3:36 am [Reply](#)

A)Control loop in C programming are 1).While()loop 2). For loop 3) Do while()loop B) the differences between while loop and Do loop is The syntax for While loop is: While(conditional statement){ Statement 1; Statement 2;

Replied by CSC/11/6685 on Dec 14, 2012, 3:36 am [Reply](#)

1. For loop, while loop, do while loop 2a. For loop initialize variables and while loop does not initialize variable 2b.. For loop accepts more than one conditional statements and while loop accepts only one conditional statements.

Replied by mts/102548 on Dec 14, 2012, 3:37 am [Reply](#)

1. For loop, while loop, do while loop 2a. For loop initialize variables and while loop does not initialize variable 2b.. For loop accepts more than one conditional statements and while loop accepts only one conditional statements.

Replied by mts/10/2494 on Dec 14, 2012, 3:38 am [Reply](#)

1. For loop, do loop, do while loop. 2. For loop takes the format (initialization, conditional statement, increment/decrement). Do while loop only have conditional statement. It doesn't have increment.

Replied by MTS/10/2570 on Dec 14, 2012, 3:40 am [Reply](#)

1. For loop and while loop 2.for loop initialize variable while loop doesnt. For loop doesnt increment and decrement

Replied by mts/10/2551 on Dec 14, 2012, 3:40 am [Reply](#)



2. Difference between for and while loop for has a limit attribute in par

Replied by csc/10/2103 on Dec 14, 2012, 3:40 am [Reply](#)

1. For loop, while loop, do while loop 2a. For loop initialize variables and while loop does not initialize variable 2b.. For loop accepts more than one conditional statements and while loop accepts only one conditional statements.

Replied by mts/10/2604 on Dec 14, 2012, 3:40 am [Reply](#)

Do while loop For loop While loop For loop (initialization, conditional statement, increment) statement } While loop (conditional statement) statement }

Replied by MTS/11/7002 on Dec 14, 2012, 3:40 am [Reply](#)

Answer to Question 1: The three loops are; 1) For loop. 2) While loop 3) Do while loop 1) For (initialization, conditional statement, increment/decrement) 2) While (Conditional statement) 3) Do while Loop (Conditional Statement)

Replied by Mts/10/2479 on Dec 14, 2012, 3:41 am [Reply](#)

For loop is used for incrementing or decrementing, while() loop is use for control structure eg certain thing should be done if certain condition is met, do while is used for conditional statement

Replied by Csc/10/2104 on Dec 14, 2012, 3:42 am [Reply](#)

While loop. For while do for loop. While loop. It used for looping until a condition is satisfied and when it is unsure how many time the code should be in loop For loop it also used for looping until a condition is satisfied btw when it is sure

Replied by csc/10/2041 on Dec 14, 2012, 3:42 am [Reply](#)

1. For loop, while loop, do while loop 2a. For loop initialize variables and while loop does not initialize variable 2b.. For loop accepts more than one conditional statements and while loop accepts only one conditional statements.

Replied by mts/10/2508 on Dec 14, 2012, 3:42 am [Reply](#)

While loop. If statement. For loop.....for statement takes its initial, condition and increment together..while do not

Replied by mts/11/6990 on Dec 14, 2012, 3:42 am [Reply](#)

The three control statements are the for loop, while() loop, do while() loop. the difference between the while() for loop is that the for loop you must initialize; conditional statement; increment/decrement.

Replied by sta/10/2527 on Dec 14, 2012, 3:44 am [Reply](#)

(1) The types of loops are: do loop, for loop and while loop. (2) using while loop, the initialization is done outside the loop while the condition is done inside the loop. for the For loop, the initialization and condition are done inside the loop.

Replied by mts/10/2492 on Dec 14, 2012, 3:44 am [Reply](#)

1) while loop- it uses conditional statement for the execute the program. For loop- it uses initialization, conditional statement

Replied by Mts/10/2565 on Dec 14, 2012, 3:46 am [Reply](#)

1. For loop, while loop, do while loop 2a. For loop initialize variables and while loop does not initialize variable 2b.. For loop accepts more than one conditional statements and while loop accepts only one conditional statements.

Replied by mts/10/2561 on Dec 14, 2012, 3:46 am [Reply](#)

1. For loop and while loop 2. differences between for loop and while loop are:

1. While () loop Do while () loop For loop 2. While loop would only execute upon a true statement while the do loop would execute at least once whether or not the condition is true.

Replied by mts/10/2555 on Dec 14, 2012, 3:51 am [Reply](#)

1. For loop, while loop, do while loop 2a. For loop initialize variables and while loop does not initialize variable 2b.. For loop accepts more than one conditional statements and while loop accepts only one conditional statements.

Replied by csc/10/2122 on Dec 14, 2012, 3:51 am [Reply](#)

1. The 3 main types of control loop are: a. For loop a. While () loop a. Do while () loop. 2. Differences btw for loop and while loop: a. For loop is used for a specific number of iterations and while loop is as long as a condition is true a.

Replied by MTS/10/2516 on Dec 14, 2012, 3:53 am [Reply](#)

For loop, while loop, do while loop 2a. For loop initialize variables and while loop does not initialize variable 2b.. For loop accepts more than one conditional statements and while loop accepts only one conditional statements.

Replied by mts/10/2487 on Dec 14, 2012, 3:57 am [Reply](#)

For loop: consist of initialization, conditional statement, increment or decrement While loop: consist only the conditional statement and increment in the block statement Do while loop: consist of the do construct followed by statement then while statement

Replied by csc/11/6642 on Dec 14, 2012, 3:58 am [Reply](#)

The three control statements are the for loop, while() loop, do while() loop. the difference between the while() for loop is that the for loop you must initialize; conditional statement; increment/decrement.

Replied by mts/10/2491 on Dec 14, 2012, 3:58 am [Reply](#)

1) The three control loops are : i). For() The bracket in front of for encloses the condition stage, initialization stage and the statement stage. In some cases some of the stages can be omitted i). While() The bracket in front of for encloses

Replied by csc/10/2145 on Dec 14, 2012, 3:59 am [Reply](#)

Reply @csc/10/2039 The answer you have provided is correct.

Replied by csc/10/2029 on Dec 14, 2012, 4:07 am [Reply](#)

@csc/10/2081 your answer was correct but is that the only conditional statement we have?

Replied by csc/10/2092 on Dec 14, 2012, 4:07 am [Reply](#)

@ csc/11/6600 good job shows you are attending class and following up! I will give you 89%. That's an A for you!

Replied by csc/10/2073 on Dec 14, 2012, 4:08 am [Reply](#)

Reply @MTS/10/2495. Correct

Replied by mts/10/2485 on Dec 14, 2012, 4:08 am [Reply](#) Reply

@csc/11/6640.....what a brilliant answer. Am impressed

Replied by csc/11/6618 on Dec 14, 2012, 4:09 am [Reply](#)

reply at mts/10/2489, the comment is good.

Replied by mts/10/2506 on Dec 14, 2012, 4:10 am [Reply](#)

Reply@csc/10/2029 your answers are correct.

Replied by sta/10/2501 on Dec 14, 2012, 4:10 am [Reply](#)

Reply@csc/10/2029 your answers are correct.

Replied by mts/10/2483 on Dec 14, 2012, 4:11 am [Reply](#)

@csc/10/2124 Good Job

Replied by csc/10/2137 on Dec 14, 2012, 4:11 am [Reply](#)

Reply@mts/10/2492 correct

Replied by sta/10/2527 on Dec 14, 2012, 4:11 am [Reply](#)

@mts/10/2495 what an intelligent answer good job Replied

by csc/10/2153 on Dec 14, 2012, 4:11 am [Reply](#) Reply @

mts/10/2485 . Correct answer

Replied by csc/10/2154 on Dec 14, 2012, 4:12 am [Reply](#)

reply@csc/10/2092,ur answer is correct

Replied by mts/10/2495 on Dec 14, 2012, 4:12 am [Reply](#)

@csc/10/2095 You didn't really state your differences in full. My own view is that for loop is mainly for initialization,conditioning,incrementationand decrementation all of which can be contained in for loop declaration whereas the while loop can only en

Replied by csc/10/2098 on Dec 14, 2012, 4:12 am [Reply](#)

Reply @mts/10/2506 question number 2 is differentiate between for loop and while loop not differentiate between do while loop and while loop

Replied by mts/10/2505 on Dec 14, 2012, 4:13 am [Reply](#)

Reply @ csc/10/2122 Correct answer!

Replied by csc/10/2145 on Dec 14, 2012, 4:13 am [Reply](#)

Reply @ csc/10/2024 good job colleague you sure would hit an A in this course with this performance.

Replied by csc/10/2073 on Dec 14, 2012, 4:13 am [Reply](#)

Reply @mts/11/7002 Your answers to question 1

Replied by mts/11/6990 on Dec 14, 2012, 4:13 am [Reply](#)

Reply @ csc/10/2024 good job colleague you sure would hit an A in this course with this performance.

Replied by csc/10/2073 on Dec 14, 2012, 4:14 am [Reply](#)

@mts/10/2570 good job

Replied by mts/10/2537 on Dec 14, 2012, 4:14 am [Reply](#)

Reply @ sta/10/2501 your answers are correct just kip it up

Replied by sta/10/2536 on Dec 14, 2012, 4:14 am [Reply](#)

Reply@mts/10/2489 The answer supplied was correct, in addition to the question 2 answer the for loop is more compressible

Replied by Mts/10/2553 on Dec 14, 2012, 4:14 am [Reply](#)

Reply@mts/10/2529 correct

Replied by sta/10/2527 on Dec 14, 2012, 4:15 am [Reply](#)

Reply @ mts/10/2557 question is difference between do loop and while loop not the difference between the 3 conditional loops

Replied by csc/10/2041 on Dec 14, 2012, 4:15 am [Reply](#)

Reply@mts/10/2529 For question One, You gave just 2 examples of control loop instead of 3. Your response for question Two is quite satisfactory. Good Work.

Replied by MTS/10/2552 on Dec 14, 2012, 4:16 am [Reply](#)

Reply @ Mts/10/2507. This is a very interesting and expository answer.

reply@csc/10/2021 your answer is wonderful

Replied by on Dec 14, 2012, 4:18 am [Reply](#)

@csc/10/2098 Your differences are not complete try to complete next time

Replied by csc/10/2095 on Dec 14, 2012, 4:18 am [Reply](#)

Reply @ mts/11/7002: you need to separate does control statements from each other. Good work

Replied by Mts/10/2511 on Dec 14, 2012, 4:19 am [Reply](#)

@ csc/10/2092....your answers are correct.....you did a good job....

Replied by mts/10/2551 on Dec 14, 2012, 4:19 am [Reply](#)

remark @MTS/10/2483 This is a good work done but you can do better

Replied by MTS/10/2487 on Dec 14, 2012, 4:19 am [Reply](#)

Csc/10/6640 good job

Replied by csc/1012153 on Dec 14, 2012, 4:20 am [Reply](#)

Reply@mts/10/2495 Very good work U did out there and also U made me realise some things about the loop statements. Thanks

Replied by csc/10/2036 on Dec 14, 2012, 4:21 am [Reply](#)

Reply@mts/10/2495 Very good work U did out there and also U made me realise some things about the loop statements. Thanks

Replied by csc/10/2036 on Dec 14, 2012, 4:21 am [Reply](#)

Reply@mts/10/2495 Very good work U did out there and also U made me realise some things about the loop statements. Thanks

Replied by csc/10/2036 on Dec 14, 2012, 4:21 am [Reply](#)

Reply@mts/10/2495 Very good work U did out there and also U made me realise some things about the loop statements. Thanks

Replied by csc/10/2036 on Dec 14, 2012, 4:21 am [Reply](#)

Reply@csc/10/2073 Your answers are right

Replied by on Dec 14, 2012, 4:22 am [Reply](#)

Reply @ mts/10/2529 your answers are correct

Replied by sta/10/2536 on Dec 14, 2012, 4:22 am [Reply](#)

reply @MTS/2529 IT IS CORRECT

Replied by MTS/10/2490 on Dec 14, 2012, 4:22 am [Reply](#)

Reply@csc/10/2023 this is true

Replied by csc/10/2105 on Dec 14, 2012, 4:22 am [Reply](#)

Reply@csc/10/2023 this is true

Replied by csc/10/2105 on Dec 14, 2012, 4:22 am [Reply](#)

Reply @Csc/10/2136. Two out of the three loops stated are wrong

Replied by Mts/10/2479 on Dec 14, 2012, 4:23 am [Reply](#)

Reply @ mts/10/2529 your answers are correct

Replied by sta/10/2536 on Dec 14, 2012, 4:24 am [Reply](#)

Reply @ mts/10/2529 your answers are correct

Replied by sta/10/2536 on Dec 14, 2012, 4:24 am [Reply](#)

Reply @ mts/10/2529 your answers are correct

Replied by sta/10/2536 on Dec 14, 2012, 4:24 am [Reply](#)

Reply @ mts/10/2529 your answers are correct

Replied by sta/10/2536 on Dec 14, 2012, 4:24 am [Reply](#)

Reply @ mts/10/2529 your answers are correct

Replied by sta/10/2536 on Dec 14, 2012, 4:24 am [Reply](#)

Reply @ mts/10/2529 your answers are correct  
 Replied by sta/10/2536 on Dec 14, 2012, 4:24 am [Reply](#)  
 Reply @ mts/10/2529 your answers are correct  
 Replied by sta/10/2536 on Dec 14, 2012, 4:24 am [Reply](#)  
 Reply @ mts/10/2529 your answers are correct  
 Replied by sta/10/2536 on Dec 14, 2012, 4:24 am [Reply](#)  
 Reply @ mts/10/2529 your answers are correct  
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 Replied by sta/10/2536 on Dec 14, 2012, 4:24 am [Reply](#)  
 Reply @ mts/10/2529 your answers are correct  
 Replied by sta/10/2536 on Dec 14, 2012, 4:24 am [Reply](#)  
 @mts/10/2537 your answer is correct  
 Replied by csc/10/2112 on Dec 14, 2012, 4:26 am [Reply](#)  
 Reply @ csc/10/2073 Good work  
 Replied by mts/10/2561 on Dec 14, 2012, 4:27 am [Reply](#)  
 reply @mts/10/2489 we l work  
 Replied by mts/10/2483 on Dec 14, 2012, 4:27 am [Reply](#)  
 Reply@csc/10/2103 You tried!  
 Replied by csc/10/2103 on Dec 14, 2012, 4:28 am [Reply](#)  
 Reply@csc/10/2103 You tried!  
 Replied by csc/10/2103 on Dec 14, 2012, 4:28 am [Reply](#)  
 Reply@csc/10/2103 You tried!  
 Replied by csc/10/2103 on Dec 14, 2012, 4:28 am [Reply](#)  
 Reply@csc/10/2103 You tried!  
 Replied by csc/10/2103 on Dec 14, 2012, 4:29 am [Reply](#)  
 Reply at mts/10/2485 is okay,nice one  
 Replied by mts/10/2520 on Dec 14, 2012, 4:29 am [Reply](#)  
 reply @mts/10/2485 correct  
 Replied by mts/10/2483 on Dec 14, 2012, 4:29 am [Reply](#)  
 The three conditional statement In C programming language are 1) The for loop construct 2) The while loop construct 3) The do while loop construct The difference between the while loop construct and the for loop construct is that there is a known ra  
 Replied by CSC/10/2131 on Dec 14, 2012, 4:30 am [Reply](#)  
 1. For loop an while loop 2. The differences between for loop and while loop are: 1. for loop initialize variables while loop doesnt 2. For loop does increment and decrement of a single statement while loop doesnt.  
 Replied by mts/10/2534 on Dec 14, 2012, 4:30 am [Reply](#)  
 Difference not in details  
 Replied by Mts/10/2559 on Dec 14, 2012, 4:31 am [Reply](#)  
 It is ok but needs more explanation with examples



@sta/10/2527 Your answer is correct

Replied by csc/10/2112 on Dec 14, 2012, 4:34 am [Reply](#)

@sta/10/2527 Your answer is correct

Replied by csc/10/2112 on Dec 14, 2012, 4:34 am [Reply](#)

@sta/10/2527 Your answer is correct

Replied by csc/10/2112 on Dec 14, 2012, 4:34 am [Reply](#)

@sta/10/2527 Your answer is correct

Replied by csc/10/2112 on Dec 14, 2012, 4:34 am [Reply](#)

@sta/10/2527 Your answer is correct

Replied by csc/10/2112 on Dec 14, 2012, 4:34 am [Reply](#)

@sta/10/2527 Your answer is correct

Replied by csc/10/2112 on Dec 14, 2012, 4:36 am [Reply](#)

Reply @ csc/10/2098. You've been able to make a good response. Thanks

Replied by csc/10/2094 on Dec 14, 2012, 4:36 am [Reply](#)

Reply @ csc/10/2098. You've been able to make a good response. Thanks

Replied by csc/10/2094 on Dec 14, 2012, 4:37 am [Reply](#)

Reply @ csc/10/2098. You've been able to make a good response. Thanks

Replied by csc/10/2094 on Dec 14, 2012, 4:37 am [Reply](#)

1. For loop, while loop and do while loop 2. for loop is used to initialize condition checks while while loop does not. For loop is used for increment and decrement of a single statement.

Replied by mts/10/2500 on Dec 14, 2012, 4:40 am [Reply](#)

1. (a.) While () loop, (b.) For () loop, (c.) Do while () loop. 2. The 'FOR () LOOP' has initialization and must execute its statement at least once while the 'WHILE () LOOP' has no initialization and it may not execute any of its statement b

Replied by CSC/10/2058 on Dec 14, 2012, 8:39 am [Reply](#)

While () loop For loop Do while () loop

Posted by csc/10/2073 on Dec 14, 2012, 2:52 am [Reply](#)

Answer to number 1. For loop, do while loop, while loop, Answer 2 number 2.

For loop initialize variable, while loop does not initialize variable. For loop increment and decrement While loop doesn't not increment and decrement

Replied by mts/10/2517 on Dec 14, 2012, 3:06 am [Reply](#)

Answer to number 1. For loop, do while loop, while loop, Answer 2 number 2.

For loop initialize variable, while loop does not initialize variable. For loop increment and decrement While loop doesn't not increment and decrement

Replied by mts/10/2517 on Dec 14, 2012, 3:07 am [Reply](#)

1. for loop and while loop 2. for loop initialize variable, while loop doesn't increment and decrement, While loop doesn't increment and decrement

Posted by michael ekanem friday mts/10/2515 on Dec 14, 2012, 3:00 am

[Reply](#)

1. The three control structures are: while () loop, for loop, do while () loop 2. The WHILE loop structure involves the conditional \_ statement while FOR loop involves initialization; conditional \_ statement; increment/decrement.

Replied by mts/10/2520 on Dec 14, 2012, 3:22 am [Reply](#) Solution 1.

1. for i. while i. do while 2. the For loop contains the initialization, conditional statement, increment/decrement E.g For (I = 1, i < n, i) while loop contains con

1.for loop and while loop 2.for loop initializes variable, while loop does not

Posted by Olanoye Michael CSC/10/2133 on Dec 14, 2012, 3:05 am [Reply](#)

The three control structure - WHILE() LOOP - FOR LOOP - DO WHILE()  
LOOP WHILE LOOP While(conditional statement) { Statement 1; ::  
Statement 2; } FOR LOOP For(initialization,conditional\_statement, inc

Replied by CSC/10/2106 on Dec 14, 2012, 3:18 am [Reply](#)

Reply@csc/10/2106.....good work

Replied by csc/11/6618 on Dec 14, 2012, 4:20 am [Reply](#)

Reply@csc/10/2106.....good work

Replied by csc/11/6618 on Dec 14, 2012, 4:22 am [Reply](#)

1. 3 control loops are for loop,while loop,do-while loop 2.Difference between for loop and while loop is that,for loop is used for a specific number of iterations and while loop is used as long as the condition is true.

Posted by CSC/10/2037 on Dec 14, 2012, 3:07 am [Reply](#)

Reply @ csc/10/2037 nice one

Replied by csc/10/2026 on Dec 14, 2012, 4:23 am [Reply](#)

In c programming there are three control structure,which are while loop,do while loop and the for loop. 1.The while loop is used In c programming as. While(conditional statement) ( statement 1; .

Posted by mts/10/2547 on Dec 14, 2012, 3:16 am [Reply](#)

1. The three control loops are the FOR loop, DO WHILE and DO loop. 2. Difference between the FOR loop and the WHILE LOOP: in the while loop, the statement will be executed at least once while the FOR loop, it might not be executed at all if the condition

Posted by on Dec 14, 2012, 3:16 am [Reply](#)

1- if statement - switch statement - conditional operator statement - goto statements - for loop and while loop 2. for loop initialize variable, whereas while loop does not, for loop increments and decrements, While loop doesn't increment and dec

Posted by Eyo okon Eyo csc/10/2093 on Dec 14, 2012, 3:18 am [Reply](#)

Reply @CSC/10/2093 I don't think the if statement and the switch statements are parts of the required answers

Replied by CSC/10/2102 on Dec 14, 2012, 4:08 am [Reply](#)

1- if statement - switch statement - conditional operator statement - goto statements - for loop and while loop 2. for loop initialize variable, whereas while loop does not, for loop increments and decrements, While loop doesn't increment and dec

Posted by Eyo okon Eyo csc/10/2093 on Dec 14, 2012, 3:19 am [Reply](#)

Reply @CSC/10/2093 I don't think the if statement and the switch statements are parts of the required answers

Replied by CSC/10/2102 on Dec 14, 2012, 4:08 am [Reply](#)

1. do-while loop; this execute a block of statement as long as the loop condition is true 2. If loop; this is used to prove a condition is true or not 3.for; if a particular condition is true then it should be executed. differentiation bet. for loop and

Posted by csc/10/0191 on Dec 14, 2012, 3:19 am [Reply](#)

1. do-while loop; this execute a block of statement as long as the loop condition

Posted by csc/10/2149 on Dec 14, 2012, 3:20 am [Reply](#)

1. for loop and while loop 2. for loop initialize variable while loop doesn't for loop increment and decrement, While loop doesn't increment and decrement

Posted by Olawumi gbolayo adeola csc/10/2134 on Dec 14, 2012, 3:22 am [Reply](#)

1. For loop, do while () loop, while () loop. 2. The differences between is: for loop: is for a specific number of iterations. while () loop: the syntax for while loop is as long as a condition is true.

Posted by CSC/10/2100 on Dec 14, 2012, 3:23 am [Reply](#)

1. for loop and while loop 2. for loop initialize variable while loop doesn't for loop increment and decrement, While loop doesn't increment and decrement

Posted by Olawumi gbolayo adeola csc/10/2134 on Dec 14, 2012, 3:23 am [Reply](#)

1 do while a control structure that executes n times due to a particular condition being true For structure a control structure that executes until a particular condition is false uses an incremental value to know the number of execution While loop execu

Posted by on Dec 14, 2012, 3:24 am [Reply](#)

1 do while a control structure that executes n times due to a particular condition being true For structure a control structure that executes until a particular condition is false uses an incremental value to know the number of execution While loop execu

Posted by on Dec 14, 2012, 3:24 am [Reply](#)

1 do while a control structure that executes n times due to a particular condition being true For structure a control structure that executes until a particular condition is false uses an incremental value to know the number of execution While loop execu

Posted by on Dec 14, 2012, 3:24 am [Reply](#)

1 do while a control structure that executes n times due to a particular condition being true For structure a control structure that executes until a particular condition is false uses an incremental value to know the number of execution While loop execu

Posted by on Dec 14, 2012, 3:24 am [Reply](#)

1 do while a control structure that executes n times due to a particular condition being true For structure a control structure that executes until a particular condition is false uses an incremental value to know the number of execution While loop execu

Posted by csc/10/2055 on Dec 14, 2012, 3:26 am [Reply](#)

REPLY @ csc/10/2055 . This is very correct, u have done a good job, congratulations

Replied by csc/10/2025 on Dec 14, 2012, 4:07 am [Reply](#)

1. For loop and while loop 2. For loop is use to initialize or continue a condition while while loop is use to evaluate the test expression before every loop, so it can execute zero time if the condition is initially false.

Posted by csc/10/2026 on Dec 14, 2012, 3:28 am [Reply](#)

Reply @CSC/10/2050 Question 1 not answer.



Replied by Csc/10/2037 on Dec 14, 2012, 4:22 am [Reply](#)

Reply @CSC/10/2126 not CSC/10/2050 Question 1 not answered

Replied by CSC/10/2100 on Dec 14, 2012, 4:28 am [Reply](#)

1. The three control loops are the FOR loop, DO WHILE and DO loop. 2. Difference between the FOR loop and the WHILE LOOP: in the while loop, the statement will be executed at least once while the FOR loop, it might not be executed at all if the condition

Posted by csc/10/2025 on Dec 14, 2012, 3:30 am [Reply](#)

1 CONTROL LOOP STRUCTURE TYPES 1. While loop 2. For loop 3. Do while loop while(expression) statement; for( initializing,conditioning,increment) 2. Difference between for loop and while loop? WHILE loop is used for looping until a condition is satisfied

Posted by CSC/11/6607 on Dec 14, 2012, 3:32 am [Reply](#)

1) -while loop : the condition for the loop to occur is put in a bracket, eg. While (condition 1) ..... -for loop : the bracket is used to initialize the condition and the statement. eg. FOR (condition, statement) -do while loop : th

Posted by Csc/10/2141 on Dec 14, 2012, 3:34 am [Reply](#)

The three control structure - WHILE() LOOP - FOR LOOP - DO WHILE() LOOP WHILE LOOP While(conditional statement){ Statement 1; :: Statement 2; } FOR LOOP For(initialization,conditional\_statement, inc

Replied by CSC/10/2105 on Dec 14, 2012, 3:44 am [Reply](#)

Reply@csc/10/2105 D answer is right!

Replied by CSC/10/2106 on Dec 14, 2012, 4:08 am [Reply](#)

Reply@csc/10/2105 The answer is right!

Replied by CSC/10/2106 on Dec 14, 2012, 4:10 am [Reply](#)

A 1] Do loop ; It is used for iteration and it might not execute in a program depending on the given condition 2] For loop It is similar to do loop in operation 3] Do while This kind of loop is a little bit different from the 2 and 1 above This loop

Posted by csc/10/2110 on Dec 14, 2012, 3:39 am [Reply](#)

1. do-while loop; this executes a block of statement as long as the loop condition is true 2. If loop; this is used to prove a condition is true or not 3. for; if a particular condition is true then it should be executed. differentiation bet. for loop and

Posted by csc/10/2067 on Dec 14, 2012, 3:41 am [Reply](#)

For loop, while loop, do-while loop Difference between for and while loops For loop is used for a specific number of iterations While loop is used as long as the condition is true

Posted by CSC/10/2090 on Dec 14, 2012, 3:42 am [Reply](#)

The three control loops in C are the: (1) Do loop (2) For loop (3) Do while loop The difference between for and while loops is: while loop - used for looping until a condition is satisfied and when it is unsure how many times the code should be in loop

Posted by CSC/11/6629 on Dec 14, 2012, 3:44 am [Reply](#)

1. The 3 control loops in C programming are: For Loop: it has initialization, condition statement, increment/decrement For (initialization; Statement 1; :: Statement 2 } While Loop(): it has only conditional\_statement

1. The 3 control loops in C programming are: For Loop: it has initialization, condition statement, increment/decrement For (initialization; Statement 1; : Statement 2 } While Loop(): it has only conditional\_statement While (conditional statement); St

Posted by STA/10/2562 on Dec 14, 2012, 3:55 am [Reply](#)

Reply @sta/10/2562 Are u sure you did this on your own

Replied by mts/10/2491 on Dec 14, 2012, 4:10 am [Reply](#)

Reply @mts/10/2491 nice one, but yo copied i guess. :-D

Replied by sta/10/2562 on Dec 14, 2012, 4:16 am [Reply](#)

Reply @mts/10/2491 nice one, but yo copied i guess. :-D

Replied by sta/10/2562 on Dec 14, 2012, 4:16 am [Reply](#)

Reply @mts/10/2491 nice one, but yo copied i guess. :-D

Replied by sta/10/2562 on Dec 14, 2012, 4:16 am [Reply](#)

@sta/10/2527 your answer is correct...

Posted by csc/10/2112 on Dec 14, 2012, 4:35 am [Reply](#)

1. (a.) While () loop, (b.) For () loop, (c.) Do while () loop. 2. The 'FOR () LOOP' has initialization and must execute its statement at least once while the 'WHILE () LOOP' has no initialization and it may not execute any of its statement b

Posted by CSC/10/2058 on Dec 14, 2012, 8:41 am [Reply](#)

# Program Listings for MOBILect

[Index.php](#)

[illegible]

```

</div>
</div>
</body>
</html>

```

## MAIN.PHP

```

<?php

require("database/strip_quotes.php");
require("database/strip_quotes_addslash.php");

Class medialist {

    function medialist(){
        //extract contents from feeds
        //overwrite youtube feed (youtube.xml) on server; on error, use
        existing youtube.xml
        libxml_use_internal_errors(true);
        $ytxml =
        @simplexml_load_file("http://www.youtube.com/rss/tag/uct.rss");
        if($ytxml){ $ytxml->asXML('youtube.xml'); }

        /* echo friendly erro message
        if($ytxml === false) {
            echo "<p> Sorry, the current Youtube XML contains some errors
        </p>";
            foreach(libxml_get_errors() as $error) {
                echo "\t", $error->message;
            }
            echo "<p>You can hit the refresh button to try again </p>";
            echo "<p>Or continue with the old Youtube XML by clicking <a
        href='http://ngportal.com/opencast/index.php'>here</a></p>";
        }
        */

        $feedurls =
        Array('http://media.uct.ac.za/feeds/atom/0.3/latest/index.xml',
        'youtube.xml');

        foreach($feedurls as $feedurl){
            $xml = @simplexml_load_file($feedurl);
            if($feedurl == $feedurls[0]){
                $xml->registerXPathNamespace('atom',
                'http://purl.org/atom/ns#');
                $this->urls = $xml-
                >xpath("/atom:feed/atom:entry/atom:link[attribute::rel='enclosure'
                and attribute::type='video/avi']/@href");

                //A tweak to display only presentation.mp4
                $newurl = array();
                $v = 0;
                for($y = 0; $y<=count($this->urls); $y++){
                    if(substr($this->urls[$y], -16, 16) == "Presentation.mp4"){

```

```

        $newurl[$v] = $this->urls[$y];
        $v++;
    }
    } //close of for loop
    //overwrite the array urls[]
    $this->urls = &$newurl;
    //end of tweak

}
else{
    $this->urls = $xml->xpath("/rss/channel/item/link");
}

    } //end of foreach - feedurls
//store urls array in $this->mediaurls
$this->mediaurls = &$this->urls;

//session begins
require_once("database/session.php");
if(!isset($this->clipinfo)){ $this->clipinfo = new Session(); }
//$this->currentclipurl = $this->clipinfo->get('currentclipurl');
// if(!isset($this->currentclipurl)){ $this->clipinfo->
>set("currentclipurl", $this->urls[0]); }

//database connection begins

// Include the MySQL class
require_once('database/MySQL.php');

//set the next and previous links
if(isset($_GET['vid'])){
    $this->clipinfo->set('currentclipurl', $_GET['vid']);
    $this->currentclipurl = $this->clipinfo->get('currentclipurl');

    medialist::getclips($this->currentclipurl);}

/*
//set the next and previous links
//if(isset($_GET['vid'])){echo $_GET['vid'];}
if(isset($_GET['vid'])){
    //$this->clipinfo->destroy();
    medialist::getclips($_GET['vid']);
}
*/

}
function loadpresentations(){
$html1 = <<<EOD
<section>
<div id="listofpresentations">
<div id="video">
EOD;
$html2 = <<<EOD
'><video id="video_preview" controls="controls">

```

```

    <source src="
EOD;

$html3 = <<<EOD
" type="video/mp4" />
    <source src="
EOD;

$html4 = <<<EOD
" type="video/ogg" />
    Your browser does not support the video tag.
</video>
</a>
</div>
<!-- 1. The <div> tag will contain the <iframe> (and video player)
<div id="player"></div>
-->
<div id="title">
EOD;

$html5 = <<<EOD
'>
EOD;

$html6 = <<<EOD
</a></div>
<div id="author">
EOD;

$html7 = <<<EOD
</div>
<div id="date_published">
EOD;

$html8 = <<<EOD
</div>
<div id="total_comments">
EOD;

$html9 = <<<EOD
</div>
<p>
<div id="view_all_comments">
EOD;

$html10 = <<<EOD
</div>
</p>
</div>
</section>
EOD;
//comment disable the youtube feed - ,
'http://www.youtube.com/rss/tag/uct.rss'

```

```

// $feedurls =
Array('http://media.uct.ac.za/feeds/atom/0.3/latest/index.xml');
$feedurls =
Array('http://media.uct.ac.za/feeds/atom/0.3/latest/index.xml',
'youtube.xml');
// $feedurls =
Array('http://media.uct.ac.za/feeds/atom/0.3/latest/index.xml',
'http://www.youtube.com/rss/tag/uct.rss');

require('database/connx.php');
// Connect to MySQL
$db = & new MySQL($host,$dbUser,$dbPass,$dbName);

// clear DB
$sql = "DELETE from mediadetails";
$result=$db->query($sql);

foreach($feedurls as $feedurl){

libxml_use_internal_errors(true);
$xml = @simplexml_load_file($feedurl);
if ($xml === false) {
    echo "Sorry, the Youtube XML contains some errors\n";
    foreach(libxml_get_errors() as $error) {
        echo "\t", $error->message;
    }
    echo "You can hit the refresh button to try again\n";
    echo "Or continue without Youtube XML by clicking <a
href='http://ngportal.com/opencast/_index.php'>here</a>\n";
}

// $xml =
simplexml_load_file('http://media.uct.ac.za/feeds/rss/2.0/latest/index.rss');
// $xml = simplexml_load_file($feedurl);

if($feedurl == $feedurls[0]){
    $xml->registerXPathNamespace('atom',
'http://purl.org/atom/ns#');
    $titles = $xml->xpath('/atom:feed/atom:entry/atom:title');
    $pubDates = $xml->xpath('/atom:feed/atom:entry/atom:issued');
    $authors = $xml->
    >xpath('/atom:feed/atom:entry/atom:author/atom:name');
    $urls = $xml->
    >xpath("/atom:feed/atom:entry/atom:link[attribute::rel='enclosure'
and attribute::type='video/avi']/@href");
    $this->source = "";
    $this->vdisplayurl = "<a href='viewvideo.php?vid='";
    $this->viewallcommentsurl = "<a
href='viewallcomments.php?vid='";

// A tweak to display only presentation.mp4
$newurl = array();

```

```

    $v = 0;
    // echo count($urls) . "<br>";
    for($y = 0; $y<=count($urls); $y++){
    if(substr($urls[$y], -16, 16) == "Presentation.mp4"){
        $newurl[$v] = $urls[$y];
        //echo "urls[" . $y . "]=" . $urls[$y] . "<br>";
        $v++;
    }
    }//close of for loop
    //overwrite the array urls[]
    $urls = &$newurl;
    $this->source = "Source: Opencast";
    //end of tweak

}
else{
    $authors = $xml->xpath('/rss/channel/item/author');
    $titles = $xml->xpath('/rss/channel/item/title');
    $pubDates = $xml->xpath('/rss/channel/item/pubDate');
    $urls = $xml->xpath("/rss/channel/item/link");
    $this->source = "Source: Youtube";
    $this->vdisplayurl = "<a href='ytvideo.php?vid=";
    $this->viewallcommentsurl = "<a
href='viewallcomments.php?vid=";
}

    $n = 0;

foreach($titles as $title) {

//instantiating variables begin
    if(isset($titles[$n])){$this-
>titles=safeAddSlashes($titles[$n]);}else{$this->titles = " ";}
    if(isset($authors[$n])){$this-
>authors=safeAddSlashes($authors[$n]);}else{$this->authors = " ";}
    if(isset($pubDates[$n])){$this-
>pubDates=safeAddSlashes($pubDates[$n]);}else{$this->pubDates = "
";}
    if(isset($urls[$n])){$this-
>urls=safeAddSlashes($urls[$n]);}else{$this->urls = " ";}
    //echo "url[".$n."]=". $urls[$n] . "<p>";
    //echo "url[".$n."]=". $this->urls . "<p>";

    //get comment size
    $this->no_of_comments = medialist::commentsize($this->urls);

    //echo $this->no_of_comments . "<p>";
    //set comment-only link
    $this->view_all_comments = $this->viewallcommentsurl . $this-
>urls . "#allcomments' id='back' style='text-decoration : none; -
webkit-border-radius: 5px; -moz-border-radius: 5px; border-radius:
5px;'>View All Comments</a>";

    if(isset($this->authors)){

```



```

        //echo $html1 . $urls[$n] . $html2 . $urls[$n] . $html3 .
        $urls[$n] . $html4 . $urls[$n] . $html5 . $titles[$n] . $html6 .
        $authors[$n] . $html7 . $pubDates[$n] . $html8 . $no_of_comments .
        $html9;
        echo $html1 . $this->vdisplayurl . $urls[$n] . $html2 .
        $urls[$n] . $html3 . $urls[$n] . $html4 . $this->vdisplayurl .
        $urls[$n] . $html5 . $this->titles . $html6 . $this->authors . $html7
        . $this->pubDates . $html8 . $this->no_of_comments . $this->source .
        $html9 . $this->view_all_comments . $html10;
    }

    else{
        //echo $html1 . $urls[$n] . $html2 . $urls[$n] . $html3 .
        $urls[$n] . $html4 . $urls[$n] . $html5 . $titles[$n] . $html6 .
        $html7 . $pubDates[$n] . $html8 . $no_of_comments . $html9;
        echo $html1 . $this->displayurl . $urls[$n] . $html2 .
        $urls[$n] . $html3 . $urls[$n] . $html4 . $this->displayurl .
        $urls[$n] . $html5 . $this->titles . $html6 . $html7 . $this-
        >pubDates . $html8 . $this->no_of_comments . $this->source . $html9
        . $this->view_all_comments . $html10;
    }

/*
$this->titles=safeAddSlashes($titles[$n]);
$this->authors=safeAddSlashes($authors[$n]);
$this->pubDates=safeAddSlashes($pubDates[$n]);
$this->urls=safeAddSlashes($urls[$n]);
*/
//storing values in DB for search functionality

$sql="INSERT mediadetails SET
str_title='$this->titles',
str_author='$this->authors',
time_pubDate='$this->pubDates',
str_url='$this->urls'";

$result=$db->query($sql);

$n++;
    }//end of foreach - title
    }//end of foreach - feedurls
//store urls array in $this->mediaurls
$this->mediaurls = $urls;
    }//end of function loadpresentations

function savecomments(){

//database connection begins
require('database/connx.php');

// Connect to MySQL
$db = & new MySQL($host,$dbUser,$dbPass,$dbName);

//storing values in DB for search functionality

```

```

//instantiating variables begin
$this->comment_author = safeAddSlashes($_POST['comment_author']);
$this->pubDate = date("M j, Y, g:i a");
$this->comment = safeAddSlashes($_POST['comment']);
$this->lead_comment_author =
safeAddSlashes($_POST['lead_comment_author']);
$this->msg_type = $_POST['msg_type'];
if(isset($_POST['vid'])){$this->presentation_url =
safeAddSlashes($_POST['vid']);}else{$this->presentation_url =
safeAddSlashes($_GET['vid']);}
$sql="INSERT comments SET
str_presentation_url='$this->presentation_url',
str_name='$this->comment_author',
str_lead_name='$this->lead_comment_author',
time_pubDate='$this->pubDate',
str_comment='$this->comment',
str_msg_type='$this->msg_type'";
//echo "<p>" . $sql . "</p>";
$result=$db->query($sql);

} //end of savecomments function

function displaycomments(){
if(isset($_POST['vid'])){$this->presentation_url =
safeAddSlashes($_POST['vid']);}else{$this->presentation_url =
safeAddSlashes($_GET['vid']);}
if(isset($_POST['lead_comment_author'])){$this->lead_comment_author
= safeAddSlashes($_POST['lead_comment_author']);}else{$this->
lead_comment_author =
safeAddSlashes($_GET['lead_comment_author']);}
if(isset($_POST['comment_author'])){$this->comment_author =
safeAddSlashes($_POST['comment_author']);}else{$this->comment_author
= safeAddSlashes($_GET['comment_author']);}
//database connection begins
require('database/connx.php');

$db = & new MySQL($host,$dbUser,$dbPass,$dbName);
$sql1="select str_name,str_comment,time_pubdate,str_msg_type from
comments where str_presentation_url='" . $this->presentation_url .
"' and str_msg_type='Posted' ";
$result1=$db->query($sql1);
$this->strcommenthtml3 = "";
$this->strcommenthtml1 = "<div><div name='no_of_comments'>" .
$result1->size() . " comments</div>";
while ($row1 = $result1->fetch()) {
    if($row1['str_msg_type'] == 'Posted'){$this->strcommenthtml2 =
"<div id='msg_type_posted'>";}
    else{$this->strcommenthtml2 = "<div id='msg_type_reply'>";};
    $this->strcommenthtml3 .= $this->strcommenthtml2 . "<span
id='db_comment'>" . $row1['str_comment'] . "</span><br/>" . "<span
id='db_comment_author'>" . $row1['str_msg_type'] . " by " .
$row1['str_name'] . " on " . $row1['time_pubdate'] . "</span> <span
id='reply'><a href='#postcomment' onclick=\"postcomment('reply', '"
. $row1['str_name'] . "');\">Reply</a></span></div>";
}

```

```

//comment out the reply link
//$this->strcommenthtml3 .= $this->strcommenthtml2 . "<span
id='db_comment'>" . $row1['str_comment'] . "</span><br/>" . "<span
id='db_comment_author'>" . $row1['str_msg_type'] . " by " .
$row1['str_name'] . " on " . $row1['time_pubdate'] .
"</span></div>";

//for each comment, display corresponding replies
$sql2="select str_name,str_comment,time_pubdate,str_msg_type from
comments where str_lead_name = '" . $row1['str_name'] . "' and
str_presentation_url=''" . $this->presentation_url . "' and
str_msg_type='Replied'";
//echo $sql2 . "<p>";
$result2=$db->query($sql2);
$this->strcommenthtml5 = "";
$this->strcommenthtml_1 = "<div>";
while ($row2 = $result2->fetch()) {
    if($row2['str_msg_type'] == 'Replied'){ $this->strcommenthtml6 =
"<div id='msg_type_reply'>";}
    else{ $this->strcommenthtml7 = "<div id='msg_type_posted'>";};
    $this->strcommenthtml5 .= $this->strcommenthtml6 . "<span
id='db_comment'>" . $row2['str_comment'] . "</span><br/>" . "<span
id='db_comment_author'>" . $row2['str_msg_type'] . " by " .
$row2['str_name'] . " on " . $row2['time_pubdate'] . "</span> <span
id='reply'><a href='#postcomment' onclick=\"postcomment('reply', '"
. $row1['str_name'] . "');\">Reply</a></span></div>";

//comment out the reply link
//$this->strcommenthtml5 .= $this->strcommenthtml6 . "<span
id='db_comment'>" . $row2['str_comment'] . "</span><br/>" . "<span
id='db_comment_author'>" . $row2['str_msg_type'] . " by " .
$row2['str_name'] . " on " . $row2['time_pubdate'] .
"</span></div>";
}
$this->strcommenthtml4 = "</div>";
$this->strcommenthtml3 .= $this->strcommenthtml_1 . $this-
>strcommenthtml5 . $this->strcommenthtml4;
//end of display of replies
}
$this->strcommenthtml4 = "</div>";
echo $this->strcommenthtml1 . $this->strcommenthtml3 . $this-
>strcommenthtml4;

} //end of displaycomments function

function commentsize($vid){
//get the exact youtube URL used to save comments
$this->strvid =substr($vid, 0, 22);
if($this->strvid == "http://www.youtube.com"){ $vid = substr($vid, 0,
42);}

$this->presentation_url = safeAddSlashes($vid);
//database connection begins
require('database/connx.php');

```

```

$db = & new MySQL($host,$dbUser,$dbPass,$dbName);
$sql="select str_name,str_comment,time_pubdate,str_msg_type from
comments where str_presentation_url='" . $this->presentation_url .
"'";
$result=$db->query($sql);
return "<div><div name='no_of_comments'>" . $result->size() . "
comments</div>";
} //end of commentsize

```

```

function gettitle($vid){
$this->presentation_url = safeAddSlashes($vid);
//append "&feature=youtube_gdata" to the youtube URL in order
to fetch its title
$this->strvid = substr($vid, 0, 22);
if($this->strvid == "http://www.youtube.com"){
$this->strvid = substr($vid, 0, 42);
$this->presentation_url = $this->strvid .
"&feature=youtube_gdata";
}
}

```

```

//database connection begins
require('database/connx.php');

```

```

$db = & new MySQL($host,$dbUser,$dbPass,$dbName);
$sql="select str_title from mediadetails where str_url='" . $this-
>presentation_url . "'";

$result=$db->query($sql);
$row = $result->fetch();
return $row['str_title'];
} //end of gettitle

```

```

function getclips(&$currentclipurl){
$vid = &$this->currentclipurl;

//search $mediaurls for the current url

$mediaurls_size = count($this->mediaurls);

foreach($this->mediaurls as $key => $value){

if($value == $vid){

$this->clipinfo->del('previousclipurl');
$this->clipinfo->del('nextclipurl');
if($key == 0){
$this->clipinfo->set("previousclipurl", $this-
>mediaurls[$key]);
}
}
}
}

```

```

        $this->clipinfo->set("previousclipurl", $this->mediaurls[$key -
1]);

    }
    if($key == $mediaurls_size - 1){
        $this->clipinfo->set("nextclipurl", $this-
>mediaurls[$key]);

    }else{
        $this->clipinfo->set("nextclipurl", $this-
>mediaurls[$key + 1]);

    }
    } //end of if value==vid
    } //end of foreach
    } //close of getclips function
function getflashurl($flashurl){
//sample url="http://media.uct.ac.za/static/892fd3b6-7e3e-410a-9d5f-
8dbb011d2c22/2c505ca9-96ee-45fd-954f-019d40321c44/Presentation.mp4";
    $this->flashurl = $flashurl;
    $this->flashurlid = substr($this->flashurl, 30, 36);
    return "http://media.uct.ac.za/engage/ui/embed.html?id=" . $this-
>flashurlid;
    } //end of getflashurl

} //end of class medialist

$instmedialist = &new medialist();
if(isset($_POST['submit'])){$instmedialist->savecomments();}
if(isset($_POST['getcomments'])){$instmedialist->displaycomments();}

?>

```

## CONNX.PHP

```

<?php

$host='srvslscet002.uct.ac.za'; // Hostname of MySQL server
$dbUser='dngambi'; // Username for MySQL
$dbPass='learning'; // Password for user
$dbName='dbmobile'; // database name

?>

```

## SERCH RESULT

```

<html lang="en">
<head>
<meta charset="utf-8">
<title>UCT OpenCast</title>
<meta name="description" content="UCT OpenCast">
<meta name="author" content="Olutayo Boyinbode">
<link rel="stylesheet" href="css/styles.css?v=1.0">
<script language="javascript" src="scripts/media.js">

```

```

</script>
</head>
<body>
<div id="mainpage">
<header>
<div id="banner">
MOBILect
</div>
</header>
<div>

<?php
class searchformedia {
//constructor function
function searchformedia(){

$html1 = <<<EOD
<section>
<div id="listofpresentations">
<div id="video">
<a href="viewvideo.php?vid=
EOD;
$html2 = <<<EOD
"><video id="video_preview" controls="controls">
  <source src="
EOD;

$html3 = <<<EOD
" type="video/mp4" />
  <source src="
EOD;

$html4 = <<<EOD
" type="video/ogg" />
  Your browser does not support the video tag.
</video>
</a>
</div>
<!-- 1. The <div> tag will contain the <iframe> (and video player)
<div id="player"></div>
-->
<div id="title">
EOD;

$html5 = <<<EOD
</div>
<div id="author">
EOD;

$html6 = <<<EOD
</div>
<div id="date_published">
EOD;

$html7 = <<<EOD

```

```

</div>
<div id="total_comments">
EOD;

$html8 = <<<EOD
</div>
</div>
</section>
EOD;

//database connection begins

// Include the MySQL class
require_once('database/MySQL.php');

require('database/connx.php');
require('database/strip_quotes.php');

// Connect to MySQL
$db = & new MySQL($host,$dbUser,$dbPass,$dbName);
$searchterm=$_POST['searchterm'];
$this->searchterm=$searchterm;
/*
$p = 0;
$n = 6;
$this->n = $n;
$sql= "select str_title, match(str_title) against('".$searchterm."')
as relevance from mediadetails where match(str_title)
against('".$searchterm."') LIMIT $p,$this->n";
$sql= "select str_title, str_author, time_pubDate, str_url,
match(str_title, str_author) against('".$searchterm."') as relevance
from mediadetails where match(str_title, str_author, time_pubDate,
str_url) against('".$searchterm."')";
*/
$sql= "select str_title,str_author,time_pubDate,str_url,
match(str_title) against('".$searchterm."') as relevance from
mediadetails where match(str_title,str_author,time_pubDate,str_url)
against('".$searchterm."')";
$result=$db->query($sql);

echo "<span class='fontstyle1'><strong>Search
Result</strong></span><hr class='dashline' width='100%' size='1'>";
while($row=$result->fetch()){
    if(isset($row['str_author'])){
        //ignore $no_of_comments between $html7 and $html8 for
both echos
        echo $html1 . $row['str_url'] . $html2 .
$row['str_url'] . $html3 . $row['str_url'] . $html4 .
$row['str_title'] . $html5 . $row['str_author'] . $html6 .
$row['time_pubDate'] . $html7 . $html8;}
    else{

```

```

        echo $html1 . $row['str_url'] . $html2 . $row['str_url'] .
$html3 . $row['str_url'] . $html4 . $row['str_title'] . $html5 .
$html6 . $row['time_pubDate'] . $html7 . $html8;
    }
    // echo $html1 . $row['str_url'] . $html2 . $row['str_url'] . $html3
    . $row['str_url'] . $html4 . $row['str_title'] . $html5 .
    $row['time_pubDate'] . $html6;

}

    }//close of function searchformedia

}

//end of searchformedia

new searchformedia();

?>

</div>
<div id="footer">
<p>&copy;<?php
echo date('Y');
?>
    UCT CS Dept<br />
        Contact: Olutayo Boyinbode {okboyinbode@gmail.com}
</p>
</div>
</div>
</body>
</html>

```

## SESSION.PHP

```

<?php
/**
 * @package SPLIB
 * @version $Id: Session.php,v 1.6 2003/08/17 22:13:17 harry Exp $
 */
/**
 * A wrapper around PHP's session functions
 * <code>
 * $session = new Session();
 * $session->set('message','Hello World!');
 * echo ( $session->get('message'); // Displays 'Hello World!'
 * </code>
 * @package SPLIB
 * @access public
 */
class Session {
    /**
     * Session constructor<br />
     * Starts the session with session_start()
    */
}

```



```

    * <b>Note:</b> that if the session has already started,
session_start()
    * does nothing
    * @access public
    */
    function Session () {
session_save_path("/home/users/web/b590/ez.asmicom/cgi-bin/tmp");
#session_start();
    }

    /**
    * Sets a session variable
    * @param string name of variable
    * @param mixed value of variable
    * @return void
    * @access public
    */
    function set ($name,$value) {
        $_SESSION[$name]=$value;
    }

    /**
    * Fetches a session variable
    * @param string name of variable
    * @return mixed value of session variable
    * @access public
    */
    function get ($name) {
        if ( isset ( $_SESSION[$name] ) )
            return $_SESSION[$name];
        else
            return false;
    }

    /**
    * Deletes a session variable
    * @param string name of variable
    * @return boolean
    * @access public
    */
    function del ($name) {
        if ( isset ( $_SESSION[$name] ) ) {
            unset ( $_SESSION[$name] );
            return true;
        } else {
            return false;
        }
    }

    /**
    * Destroys the whole session
    * @return void
    * @access public
    */
    function destroy () {

```

```

        $_SESSION = array();
        session_destroy();
    }
}
?>

```

## VIEWALLCOMMENTS.PHP

```
<?php
```

```
require("main.php");
```

```

?>
<!doctype html>
<html lang="en">
<head>
<meta charset="utf-8">
<title>UCT OpenCast</title>
<meta name="description" content="UCT OpenCast">
<meta name="author" content="Olutayo Boyinbode">
<link rel="stylesheet" href="css/styles.css?v=1.0">
<script language="javascript" src="scripts/ajax.js">
</script>
<script language="javascript" src="scripts/media.js">
</script>
</head>
<body>
<form name='commentform' method='post'>
<div id="pagecontent">
<div id="mainpage">
<header>
<div id="banner">
MOBILect
</div>
</header>
<div id="search_textfield"><div id="div_back"><input type="button"
name="back" id="back" value="Back" onclick="history.go(-1);"/></div>
<div id="div_download">
<input type="button" id="download" name="download" value="Download"
onclick="window.open('<?php echo $_GET['vid'];?>');"/>
</div></div>
<div>

<section>
<div id="viewpresentation">
<div id="title">View All Comments <?php echo $instmedialist-
>gettitle($_GET["vid"]); ?></div>
<div id="video">

<a name="allcomments"></a>
<div id="commentfield">
<div id="comments">

```

```

<?php
    $instmedialist->displaycomments();
?>
</div>

</div>

</div>
</div>

</section>
</div>
</div>
<div id="footer">
<p>&copy;<?php
echo date('Y');
?>
    UCT CS Dept<br />
    Contact: Olutayo Boyinbode {okboyinbode@gmail.com}
</p>
</div>
</div>
</form>
</body>
</html>

```

## VIEWVIDEO.PHP

```

<?php

require("main.php");

?>
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<head>
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<title>UCT OpenCast</title>
<meta name="description" content="UCT OpenCast">
<meta name="author" content="Olutayo Boyinbode">
<link rel="stylesheet" href="css/styles.css?v=1.0">
<script language="javascript" src="scripts/ajax.js">
</script>
<script language="javascript" src="scripts/media.js">
</script>
</head>
<body>
<form name='commentform' method='post'>
<div id="pagecontent">
<div id="mainpage">
<header>
<div id="banner">

```

```

MOBILect
</div>
</header>
<div id="search_textfield"><div id="div_back"><input type="button"
name="back" id="back" value="Back" onclick="history.go(-1);"/></div>
<div id="div_download"><input type="button" id="download"
name="download" value="Download" onclick="window.open('<?php echo
$_GET['vid'];?>');"/></div></div>
<div>

<!--
<section>
<div id="listofpresentations">
<div id="video">
-->
<!--The <video> tag is changed to the <div> tag, which now loads the
video -->
<!--
<div id="player" width="640" height="480" controls="controls">
</div>
</div>
</div>
<div id="comments">Comments</div>
<div id="write_comment">Write a Comment</div>
<div id="clips_controller"> |
</div>
</section>
-->

<section>
<div id="viewpresentation">
<div id="title"><?php echo $instmedialist->gettitle($_GET["vid"]);
?></div>
<div id="video">
<video id="video_control" controls="controls" autoplay="autoplay">
<source src="<?php echo $_GET["vid"]; ?>" type="video/x-msvideo" />
<source src="<?php echo $_GET["vid"]; ?>" type="video/mp4" />
<source src="<?php echo $instmedialist->getflashurl($_GET["vid"]);
?>" type="application/x-shockwave-flash"/>
<embed id="video_control" src="<?php echo $instmedialist-
>getflashurl($_GET["vid"]); ?>" />
    Your browser does not support the video tag.
</video>
<!-- <embed id="video_control" src="<?php echo $instmedialist-
>getflashurl($_GET["vid"]); ?>" /> -->
<!--
<object id="video_control">
<param value="<?php echo $_GET["vid"]; ?>"></param>
<param name="allowFullScreen" value="true"></param>
<param name="controller" value="true"></param>
<param value="always"></param>
<param name="type" value="video/mp4"></param>
    <param name="src" value="<?php echo $_GET['vid']; ?>"></param>
</object>
-->

```

```



```

```

</body>
</html>
YTVIDEO.PHP

```

```

<?php

```

```

require("_main.php");

```

```

?>
<!doctype html>
<html lang="en">
<head>
<meta charset="utf-8">
<title>UCT OpenCast</title>
<meta name="description" content="MOBILE LECTURES">
<meta name="author" content="Olutayo Boyinbode">
<link rel="stylesheet" href="css/styles.css?v=1.0">
<script language="javascript" src="scripts/ajax.js">
</script>
<script language="javascript" src="scripts/media.js">
</script>
</head>
<body>
<form name='commentform' method='post'>

    <script>
        // 2. This code loads the IFrame Player API code
        asynchronously.
        var tag = document.createElement('script');
        tag.src = "http://www.youtube.com/player_api";
        var firstScriptTag =
document.getElementsByTagName('script')[0];
        firstScriptTag.parentNode.insertBefore(tag, firstScriptTag);

        // 3. This function creates an <iframe> (and YouTube player)
        // after the API code downloads.
        var player;
        function onYouTubePlayerAPIReady() {
            //get videoID from url
            var strvideourl = document.commentform.presentation_url.value;
            var strvideoid = strvideourl.substr(31, 35);
            //alert(strvideoid);
            player = new YT.Player('player', {
                height: '360',
                width: '480',
                videoId: strvideoid,
                events: {
                    'onReady': onPlayerReady,
                    'onStateChange': onPlayerStateChange
                }
            });
        }
    </script>

```

```

        // 4. The API will call this function when the video player is
ready.
        function onPlayerReady(event) {
            event.target.playVideo();
        }

        // 5. The API calls this function when the player's state
changes.
        //      The function indicates that when playing a video
(state=1),
        //      the player should play for six seconds and then stop.
        var done = false;
        function onPlayerStateChange(event) {
            if (event.data == YT.PlayerState.PLAYING && !done) {
                // setTimeout(stopVideo, 6000);
                done = true;
            }
        }
        function stopVideo() {
            player.stopVideo();
        }
    </script>

<div id="pagecontent">
<div id="mainpage">
<header>
<div id="banner">
MOBILect
</div>
</header>
<div id="search_textfield"><div id="div_back"><input type="button"
name="back" id="back" value="Back" onclick="history.go(-1);"/></div>
<div id="div_download"><input type="button" id="download"
name="download" value="Download" onclick="window.open('<?php echo
$_GET['vid'];?>')';"/></div></div>
<div>

<!--
<section>
<div id="listofpresentations">
<div id="video">
-->
<!--The <video> tag is changed to the <div> tag, which now loads the
video -->

<section>
<div id="viewpresentation">
<div id="title"><?php echo $instmedialist->gettitle($_GET["vid"]);
?></div>
<div id="video">
    <!-- 1. The <iframe> (and video player) will replace this <div>
tag. -->
    <div id="player"></div>
<!--

```

```

<video id="video_control" controls="controls" autoplay="autoplay">
<source src="<?php echo $_GET["vid"]; ?>" type="video/x-msvideo" />
<source src="<?php echo $_GET["vid"]; ?>" type="video/mp4" />
<source src="<?php echo $instmedialist->getflashurl($_GET["vid"]);
?>" type="application/x-shockwave-flash"/>
<embed id="video_control" src="<?php echo $instmedialist->
getflashurl($_GET["vid"]); ?>" />
    Your browser does not support the video tag.
</video>
-->

```

```

<input type='hidden' name='presentation_url' value="<?php
if(isset($_GET['vid'])) {echo $_GET['vid'];} ?>" />
</div>
<!-- 1. The <div> tag will contain the <iframe> (and video player)
<div id="player"></div>
-->
</div>

```

```

<div id="commentfield">
<div id="comments">

```

```

<?php
    $instmedialist->displaycomments();
?>
</div>
<div id="write_comment"><a href="#postcomment"
onclick="postcomment();">Write a Comment</a></div>
</div>
<div id="search_textfield"><?php
$chkcurrentclipurl = &$instmedialist->clipinfo->
get('currentclipurl');

//if((!isset($chkcurrentclipurl))&&(isset($_GET['vid']))) {
if(isset($_GET['vid'])) {
    //$clipinfo = new Session();

    $instmedialist->clipinfo->del('currentclipurl');
    //$instmedialist->clipinfo->destroy();
    $instmedialist->clipinfo->set('currentclipurl', $_GET['vid']);
    $chgcurrentclipurl = $instmedialist->clipinfo->
get('currentclipurl');
}

?><div id='div_back'><a href=viewvideo.php?vid=<?php echo
$instmedialist->clipinfo->get('previousclipurl'); ?>><img
src='images/__left_images.jpg'/>Previous Clip</a></div> <div
id='div_download'><a href=viewvideo.php?vid=<?php echo
$instmedialist->clipinfo->get('nextclipurl'); ?>><img
src='images/__right_images.jpg'/>Next Clip</a></div> </div>
</section>
</div>
</div>
<div id="footer">

```



```

<p>&copy;<?php
echo date('Y');
?>
    UCT CS Dept<br />
        Contact: Olutayo Boyinbode {okboyinbode@gmail.com}
</p>
</div>
</div>
</form>
</body>
</html>

```

## MYSQL

```

<?php
/**
 * @package SPLIB
 * @version $Id: MySQL.php,v 1.6 2003/09/23 19:39:11 harry Exp $
 */
/**
 * MySQL database Connection Class
 * @access public
 * @package SPLIB
 */
class MySQL {
    /**
     * MySQL server hostname
     * @access private
     * @var string
     */
    var $host;

    /**
     * MySQL username
     * @access private
     * @var string
     */
    var $dbUser;

    /**
     * MySQL user's password
     * @access private
     * @var string
     */
    var $dbPass;

    /**
     * Name of database to use
     * @access private
     * @var string
     */
    var $dbName;

    /**
     * MySQL Resource link identifier stored here
     * @access private

```

```

* @var string
*/
var $dbConn;

/**
* Stores error messages for connection errors
* @access private
* @var string
*/
var $connectError;

/**
* MySQL constructor
* @param string host (MySQL server hostname)
* @param string dbUser (MySQL User Name)
* @param string dbPass (MySQL User Password)
* @param string dbName (database to select)
* @access public
*/
function MySQL ($host, $dbUser, $dbPass, $dbName) {
    $this->host=$host;
    $this->dbUser=$dbUser;
    $this->dbPass=$dbPass;
    $this->dbName=$dbName;
    $this->connectToDb();
}

/**
* Establishes connection to MySQL and selects a database
* @return void
* @access private
*/
function connectToDb () {
    // Make connection to MySQL server
    if (!$this->dbConn = @mysql_connect($this->host,
                                     $this->dbUser,
                                     $this->dbPass)) {
        trigger_error('Could not connect to server');
        $this->connectError=true;
    }
    // Select database
    } else if ( !@mysql_select_db($this->dbName,$this->dbConn) )
    {
        trigger_error('Could not select database');
        $this->connectError=true;
    }
}

/**
* Checks for MySQL errors
* @return boolean
* @access public
*/
function isError () {
    if ( $this->connectError )
        return true;
}

```

```

        $error=mysql_error ($this->dbConn);
        if ( empty ($error) )
            return false;
        else
            return true;
    }

    /**
     * Returns an instance of MySQLResult to fetch rows with
     * @param $sql string the database query to run
     * @return MySQLResult
     * @access public
     */
    //Mike:::Below line was changed from function & query($sql) {...
- php5 new requirement
    function query($sql) {
        if (!$queryResource=mysql_query($sql,$this->dbConn))
            trigger_error ('Query failed: '.mysql_error($this-
>dbConn).
                                ' SQL: '.$sql);
        return new MySQLResult($this,$queryResource);
    }
}

/**
 * MySQLResult Data Fetching Class
 * @access public
 * @package SPLIB
 */
class MySQLResult {
    /**
     * Instance of MySQL providing database connection
     * @access private
     * @var MySQL
     */
    var $mysql;

    /**
     * Query resource
     * @access private
     * @var resource
     */
    var $query;

    /**
     * MySQLResult constructor
     * @param object mysql (instance of MySQL class)
     * @param resource query (MySQL query resource)
     * @access public
     */
    function MySQLResult(& $mysql,$query) {
        $this->mysql=& $mysql;
        $this->query=$query;
    }
}

```

```

/**
 * Fetches a row from the result
 * @return array
 * @access public
 */
function fetch () {
    if ( $row=mysql_fetch_array($this->query,MYSQL_ASSOC) ) {
        return $row;
    } else if ( $this->size() > 0 ) {
        mysql_data_seek($this->query,0);
        return false;
    } else {
        return false;
    }
}

/**
 * Returns the number of rows selected
 * @return int
 * @access public
 */
function size () {
    return mysql_num_rows($this->query);
}

/**
 * Returns the ID of the last row inserted
 * @return int
 * @access public
 */
function insertID () {
    return mysql_insert_id($this->mysql->dbConn);
}

/**
 * Checks for MySQL errors
 * @return boolean
 * @access public
 */
function isError () {
    return $this->mysql->isError();
}
}
?>

```